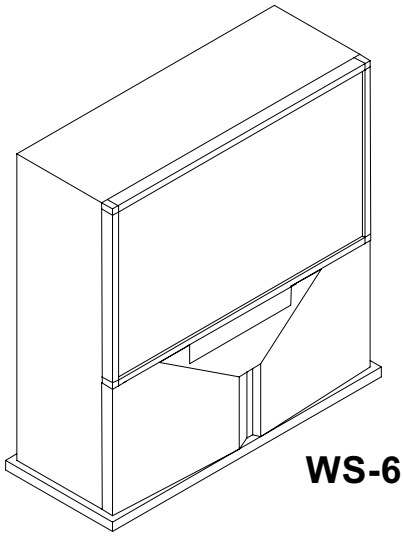
2001

MITSUBISHI ELECTRIC

Service Manual

PROJECTION TELEVISION
V19 / V19+ CHASSIS



WS-65869

V19 MODELS	V19+ MODELS
WS-55859	WS-55909
WS-65869	WS-65909
	WS-73909

CAUTION:
Before servicing this chassis, it is important that the service person read the "SAFETY PRECAUTIONS" and "PRODUCT SAFETY NOTICE" contained in this manual.

SPECIFICATIONS

- **Power Input** : AC 120V, 60Hz
- **Power Usage** : 300W

- **Frequency Range** : VHF 54 ~ 470MHz
  UHF 470 ~ 806MHz

- **Antenna Input** : VHF/UHF 75Ω unbalanced
  2 - NTSC
  1 - ATV/QAM

- **CRT Size** : [7 inches]
  : [9 inches] WS-73909 only

- **High Voltage** : 32.0kV (at 0A)

- **Speaker** : [WS-55859]]
  5" round type, full range 2 pcs. (8Ω 10W)
  : [WS-65869]
  6" round type, full range 2 pcs. (8Ω 10W)
  : [WS-55909 / WS-65909 / WS-739090]
  5" round type, full range 2 pcs. (8Ω 10W)
  2" round type, tweeter 2 pcs. (8Ω 10W)

- **Weight** : [WS-55859 250 lbs
  : [WS-55909] 256 lbs
  : [WS-65869] 326 lbs
  : [WS-65909] 348 lbs
  : [WS-73909] 405 lbs

- **Cabinet Dimensions** : [Model] (H)x(W)x(D)
  : [WS-55859] 50.3"x50.6"x27.8"
  : [WS-55909] 51.4"x46.9"x28.1"
  : [WS-65869] 61.9"x59"x28.1"
  : [WS-65909] 61.5"x58.2"x28.3"
  : [WS-73909] 65.7"x65.2"x29.8"

- **Input Level** : VIDEO IN JACK (RCA Type)
  1.0Vp-p 75Ω unbalanced
  : AUDIO IN JACK (RCA Type)
  -4.7dBm 43kΩ unbalanced
  : S-VIDEO IN JACK
  (Y/C separate type)
  Y:1.0 Vp-p C:0.286Vp-p(BURST)
  75Ω unbalanced
  : COMP / Y, Cr, Cb (RCA Type)
  Y: 1.0 Vp-p Cr, Cb: 700mVp-p
  : ATV / Y(G), Pr(R), Pb(B), H, V
  Y: 1.0Vp-p with sync 75Ω (BNC)
  Pr, Pb: 700mV 75Ω
  H, V: 3.0Vp-p 75Ω
  : VGA / R,G,B,V,H (15 pin D)

- **Output Level** : VIDEO OUT JACK (RCA Type)
  1.0Vp-p 75Ω unbalanced
  : AUDIO OUT JACK (RCA Type)
  -4.7dBm 4.7kΩ unbalanced

- **Digital Interface**
  : IEEE-1394 I/O Jacks
  : AC-3 Digtal Audio Output

- Weight and dimensions shown are approximate.
- Design specifications are subject to change without notice.

MITSUBISHI DIGITAL ELECTRONICS AMERICA, INC.
9351 Jeronimo Road, Irvine, CA 92618-1904
Copyright © 2001 Mitsubishi Digital Electronics America, Inc.
All Rights Reserved

CONTENTS

INTRODUCTION **5**

PRODUCT SAFETY NOTICE **5**

SAFETY PRECAUTIONS **6**

DISASSEMBLY
- **Cabinet Disassembly (Front View)** **7**
  - WS-55859 7
  - WS-65869 8
  - WS-55909 / WS-65909 / WS-73909 9
- **Cabinet Disassembly (Rear View)** **10**
  - WS-55859 / WS-55909 / WS-65869 / WS-65909 / WS-73909 10

SERVICING THE LENTICULAR SCREEN AND FRESNEL LENS
- **Lenticular Screen and Fresnel Lens Removal** **11**
  - WS-55859 11
  - WS-55909 / WS-65869 / WS-65909 / WS-73909 12
- **Lenticular Screen and Fresnel Lens Installation** **13**

SERVICING THE DIAMONDSHIELDS™
- DiamondShield ™ Removal & Installation 14

SERVICING PCBs
- Chassis Removal 15
- PCB Locations 16
- Main Components Location 16
- DM Module Main Components Location 17

CRT REPLACEMENT
- CRT Removal 18
- CRT Installation 19

ELECTRICAL ADJUSTMENTS
- Test Equipment 21
- Initial Setup 22
- LED Indicator Diagnostics 23
- Remote Control Operational Mode 23
- Circuit Adjustment Mode 24
- On Screen Display Position Mode 25
- Convergence Adjustment Mode 25
- E2PROM Replacement 27
- Adjustment Items List 27
- Adjustment Test Points 30
- Adjustment Procedures 31
  - Audio Circuit 31
  - High Voltage Regulation 32
  - Main/Sub Y Level 32
  - Side by Side Sub Picture Tint 33
  - Side by Side Sub Picture Color 33
  - CRT Cutoff 34
  - White Balance (NTSC) 34
  - White Balance (HD) 35
  - Cb, Cr Offset 35

Black Level 36
Sub Contrast 36
Dynamic Focus Preset 37
Lens Focus 37
Electrostatic Focus & Alignment Magnet Adjustment 38
On Screen Display Character Position 38
Deflection/Convergence Geometry Presets 39
Deflection Circuit Geometry Adjustments 40
Convergence Circuit Geometry Adjustments 41
Centering and Static Convergence 42
Coarse Convergence Adjustments 43
Fine Convergence Adjustments 44

CHIP PARTS REPLACEMENT 45

REPLACEMENT PARTS
Parts Ordering 46
Critical and Warranty Parts Designation 46
Parts Tolerance Codes 46
Quick Reference List 47
Service Parts List 48
Screen Parts List 59

CIRCUITRY BLOCK DIAGRAMS
Standby Supplies Regulator 61
Switched Supplies Regulator 62
DM Power Supply 63
Video / Color A/V Switch Circuit 64
Video / Color Signal Path 65
Sync Signal Path 66
Deflection / HV 67
X-Ray Protect 67
Sound Circuit 68
Convergence 69
Control Circuitry 70

Section 2 .... Schematic Diagrams

SCHEMATIC DIAGRAMS
Overall Block Diagram 1
PCB-MAIN 2
PCB-POWER 3
PCB-TERMINAL 4
PCB-SIGNAL-1 (MICRO) 5
PCB-SIGNAL-2 (AV I/O) 6
PCB-SIGNAL-3 (VIDEO / CHROMA) 7
PCB-3DYC 8
PCBs-CONV GEN / JUNGLE 9
PCBs - CRT / CONTROL / SVM / DBF / DM POWER 10
PCB-2HDW-1 11
PCB-2HDW-2) 12
PCB-2HDW-3 13

PCB LAYOUT DIAGRAMS 14

INTRODUCTION

This service manual provides service instructions for PTV Models WS-55859 and WS-65869 which use the V19 chassis, and PTV Models WS-55909, WS-65909 and WS-73909 which use the V19+ chassis. Service personnel should read this manual thoroughly before servicing these chassis.

This service manual includes:

1. Assembly and disassembly instructions for the front and rear cabinet components.
2. Servicing of the Lenticular Screen and Fresnel Lens.
3. Servicing printed circuit boards (PCBs).
4. CRT replacement procedure.
5. Electrical adjustments.
6. Chip parts replacement procedures.
7. Circuit path diagrams.

The parts list section of this service manual includes:

1. Cabinet and screen parts.
2. Electrical parts.

Schematic and block diagrams of the above listed models are included in this service manual for better understanding of the circuitry. PCB drawings are also included for easy location of parts and test points.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in television receivers have special safety related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc.

Replacement parts which have special safety characteristics are identified in this service manual.

Electrical components having such features are identified by shading on the schematic diagram and by **bold type** in the parts list of this service manual. **The replacement for any safety part should be identical in value and characteristics.**

SAFETY PRECAUTIONS

NOTICE: Observe all cautions and safety related notes located inside the receiver cabinet and on the receiver chassis.

WARNING:

1. Operation of this receiver outside the cabinet or with the cover removed presents a shock hazard from the receiver's power supplies. Work on the receiver should not be attempted by anyone who is not thoroughly familiar with the precautions necessary when working on high voltage equipment.
2. Do not install, remove or handle the picture tubes in any manner unless shatterproof goggles are worn. People not so equipped should be kept away while the picture tube is being handled. Keep the picture tube away from the body while handling.
3. When service is required, observe the original lead dress. Extra precaution should be taken to assure correct lead dress in the high voltage area. Where a short-circuit has occurred, replace those components that indicate evidence of overheating.

X-Radiation warning

The surface of the cathode ray tubes (CRTs) may generate X-Radiation, so take proper precautions when servicing. It is recommended that a lead apron be used for shielding while handling the CRT. Use this method if possible.

When replacing the CRTs, use only the designated replacement part since it is a critical component with regard to X-Radiation. High voltage must be set as prescribed under the section titled Electrical Adjustments.

Leakage current check

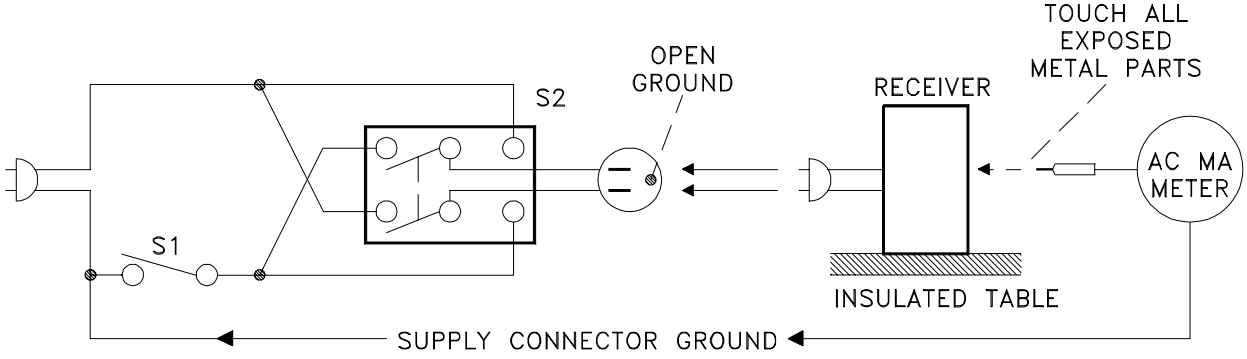
Before returning the receiver to the customer, it is recommended that leakage current be measured according to the following methods.

1. *Cold Check*

   With the alternating current (AC) plug removed from the AC source, place a jumper across the two AC plug prongs. Connect one lead of an ohm meter to the AC plug and touch the other lead to each exposed metal part (i.e. antennas, handle bracket, metal cabinet, screw heads, metal overlay, control shafts, etc.), particularly any exposed metal part that has a return path to the chassis. The resistance of the exposed metal parts having a return path to the chassis **should be a minimum of 1Mega Ohm**. Any resistance below this value indicates an abnormal condition and requires corrective action.

2. *Hot Check ...Use the circuit shown below to perform the hot check test.*

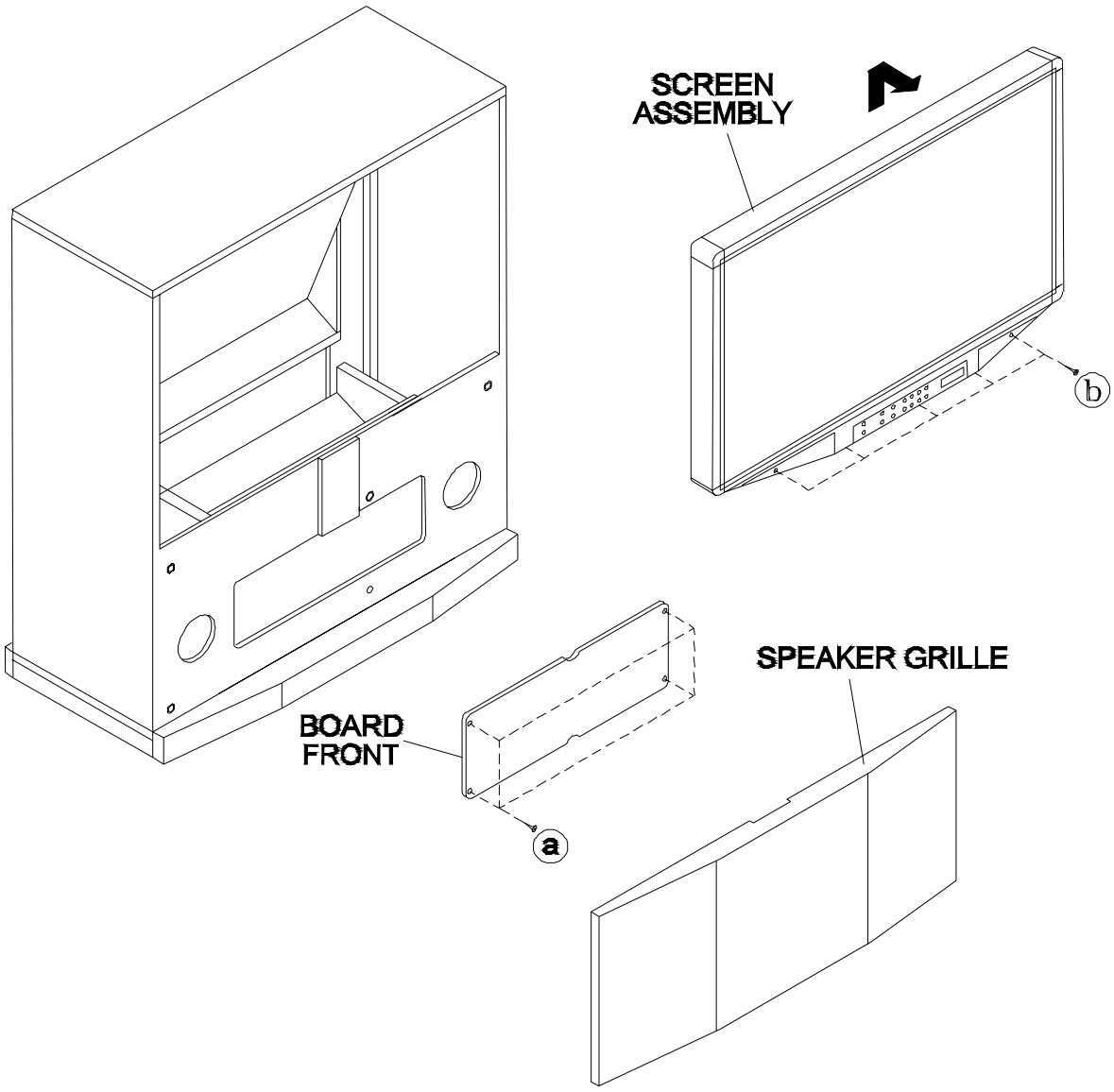
   1. Keep switch S1 open and connect the receiver to the measuring circuit. Immediately after connection, and with the switching devices of the receiver in their operating positions, measure the leakage current for both positions of switch S2.
   2. Close switch S1, energizing the receiver. Immediately after closing switch S1, and with the switching devices of the receiver in their operating positions, measure the leakage current for both positions of switch S2. Repeat the current measurements of items 1 and 2 after the receiver has reached thermal stabilization. **The leakage current must not exceed 0.5 milliampere (mA).**



CABINET DISASSEMBLY (FRONT VIEW)

WS-55859

***Refer to the Parts List for Part Numbers**



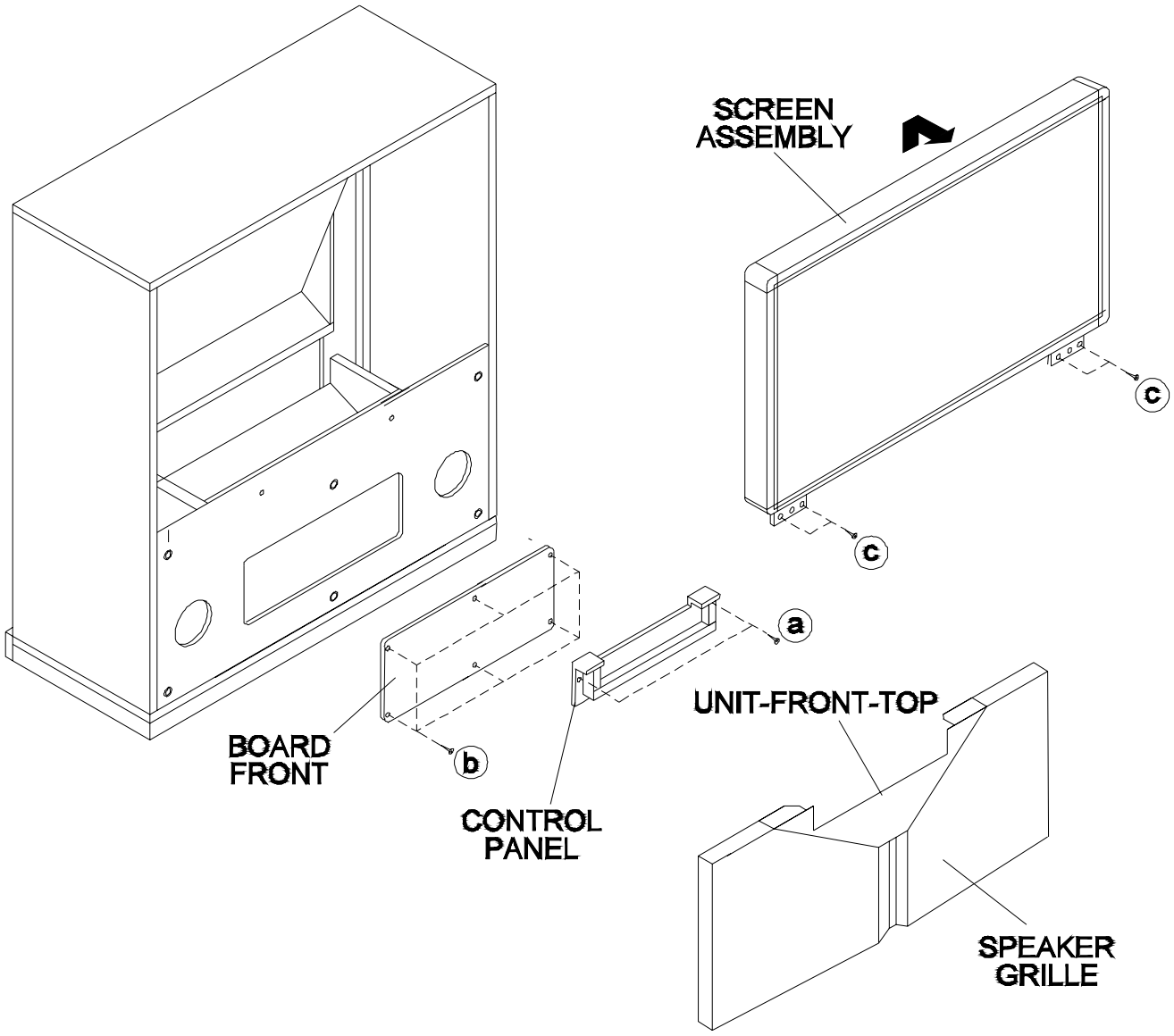
1a. Front Cabinet Disassembly

1. Remove the Speaker Grille by pulling forward.
2. Remove the Board Front by removing 4 screws (a).
3. Remove the 4 screws (b) holding the Screen Assembly.
4. Lift the Screen Assembly up and away from the cabinet.

CABINET DISASSEMBLY (FRONT VIEW)

WS-65869

***Refer to the Parts List for Part Numbers**



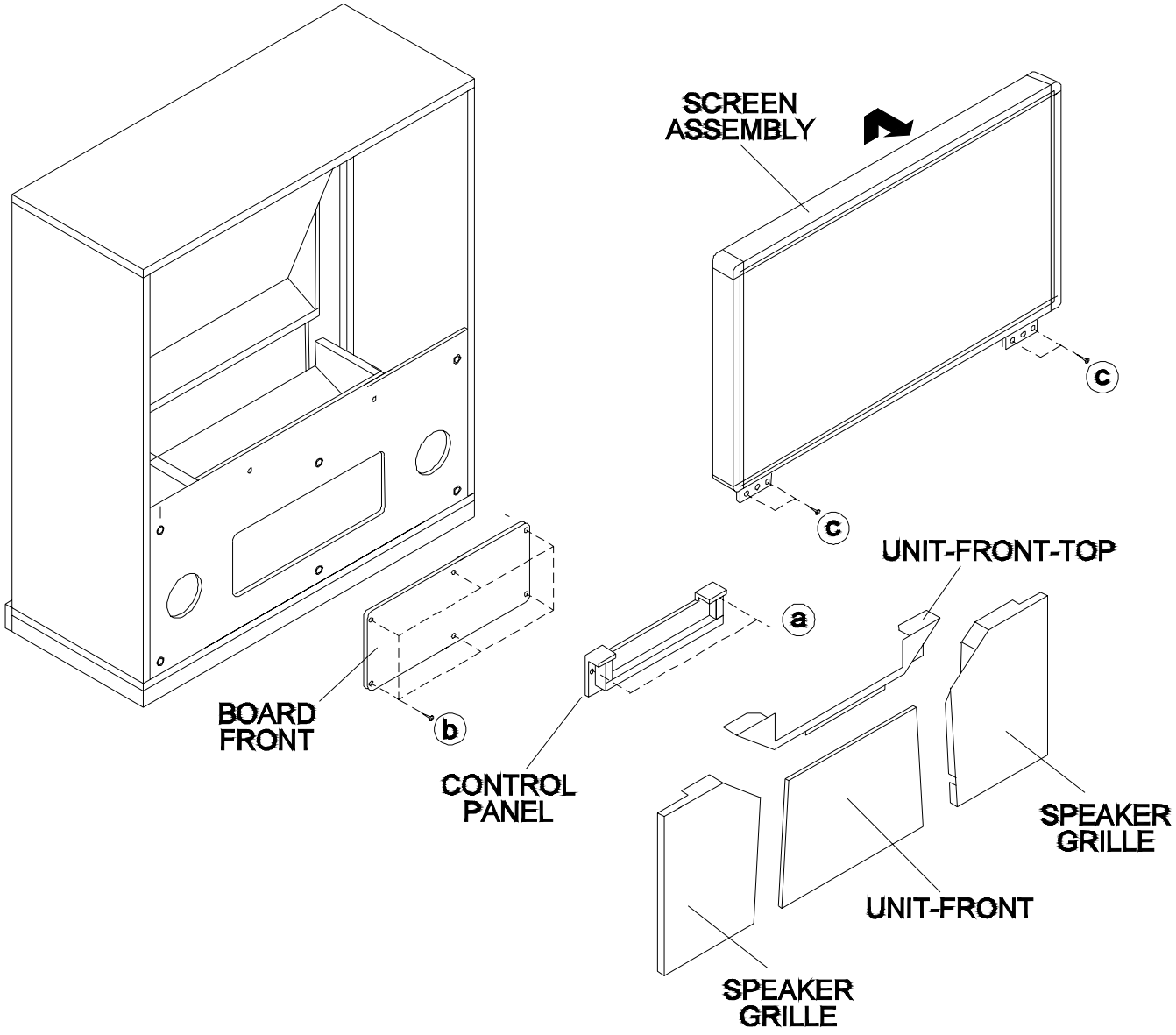
1b. Front Cabinet Disassembly

1. Remove the Speaker Grille by pulling forward.
2. Remove the Board Front by removing screws (b)
3. Remove the Control Panel by removing two screws (a).
4. Remove the four screws (b) holding the Screen Assembly.
5. Lift the Screen Assembly up and away from the cabinet.

CABINET DISASSEMBLY (FRONT VIEW)

WS-55909 / WS-65909 / WS-73909

***Refer to the Parts List for Part Numbers**



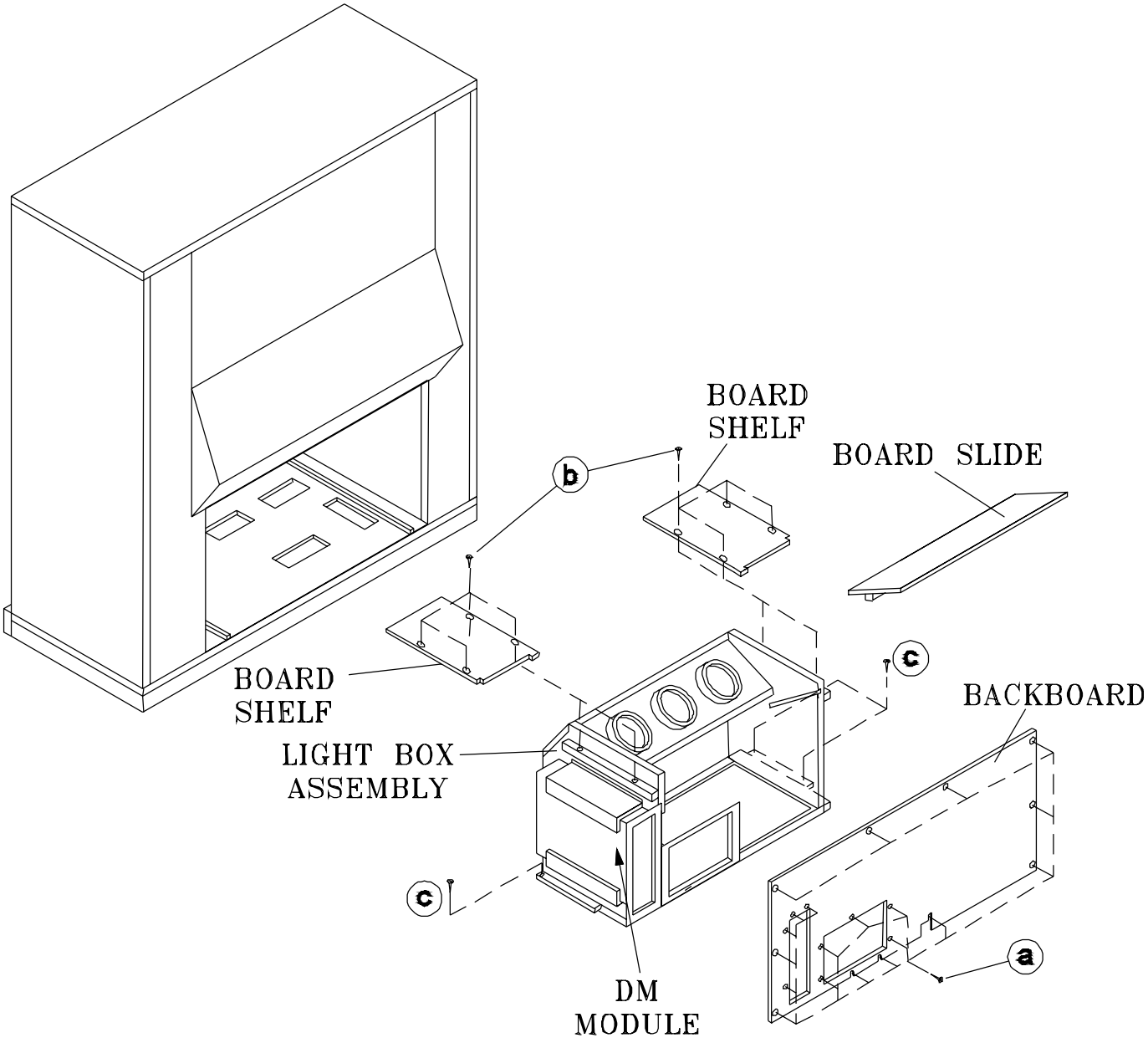
1c. Front Cabinet Disassembly

1. Remove the Speaker Grille by pulling forward.
2. Remove 2 screws (a) to remove the Control Panel.
3. Remove the Board Front by removing 4 screws (b).
4. Remove the 4 screws (c) holding the Screen Assembly.
5. Lift the Screen Assembly up and away from the cabinet.

CABINET DISASSEMBLY (REAR VIEW)

WS-55859 / WS-55909 / WS-65869 / WS-65909 / WS-73909

***Refer to the Parts List for Part Numbers**



2b. Rear Cabinet Disassembly

1. Remove screws (a) holding the Back Board.
2. Remove the 4 screws (b) holding each Board Shelf.
3. Remove the 4 screws (c) securing the Light Box Assembly.
4. Slide the Light Box out the rear of the Cabinet.

SERVICING THE LENTICULAR SCREEN AND FRESNEL LENS

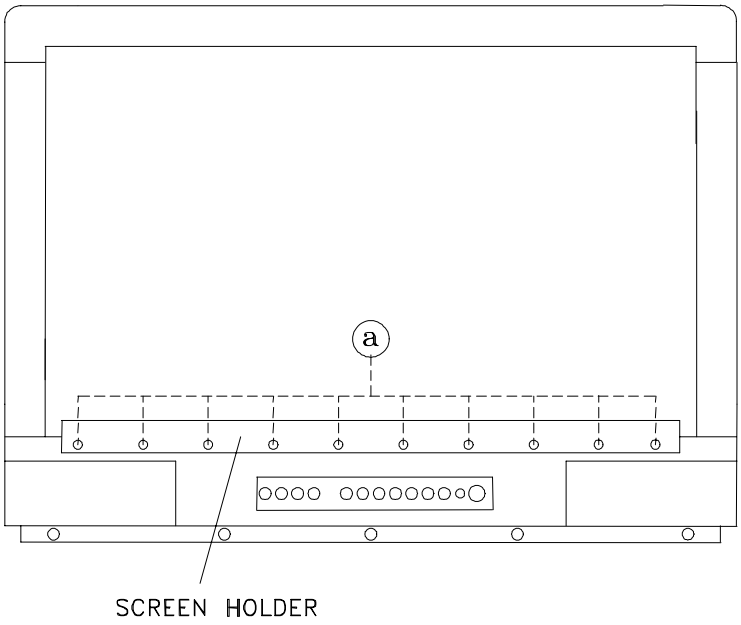
CAUTION: **Wear gloves** when handling the Lenticular Screen and Fresnel Lens. This prevents cuts and finger prints. **Do not place Fresnel Lens in the sun**. This may cause fire and heat related injuries.

WS-55859

1a. Lenticular Screen and Fresnel Lens Removal

1. Remove the screen assembly shown in the Cabinet Disassembly procedure.
2. Remove the screws (a) securing the Screen Holder.
3. Slide the Lenticular Screen and Fresnel Lens from the Screen Frame.

Note: When separating the Lenticular Screen from the Fresnel Lens, use caution while prying the Screen and Lens apart. Use a slot type screw drive, and remove the pressure sensitive double sided tape.



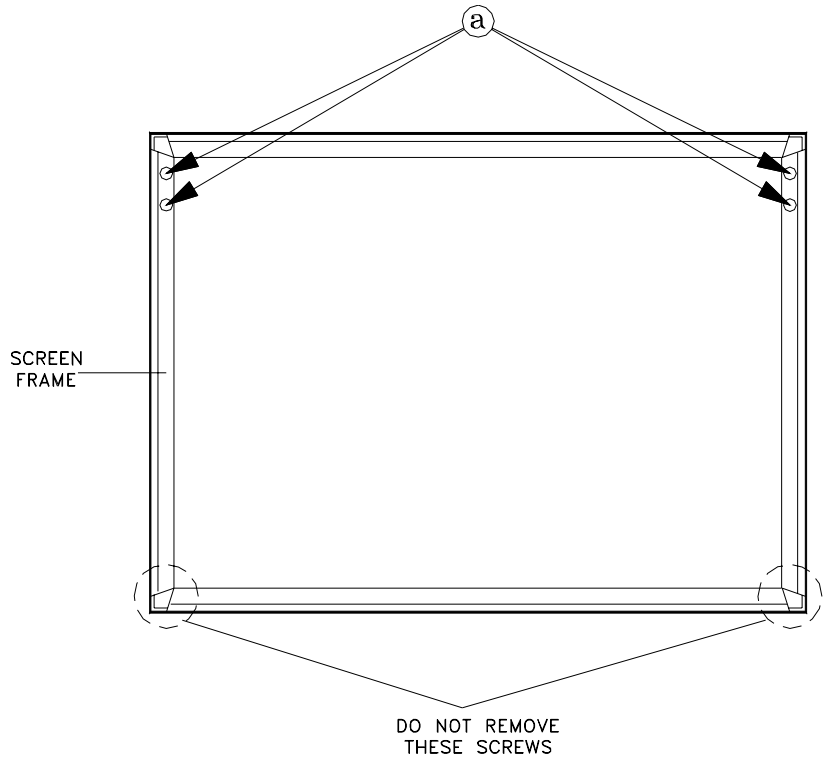
SERVICING THE LENTICULAR SCREEN AND FRESNEL LENS

CAUTION: **Wear gloves** when handling the Lenticular Screen and Fresnel Lens. This prevents cuts and finger prints. **Do not place Fresnel Lens in the sun**. This may cause fire and heat related injuries.

WS-55909 / WS-65869 / WS-65909 / WS-73909
1b. Lenticular Screen and Fresnel Lens Removal

1. Remove the screen assembly shown in the Cabinet Disassembly procedure.
2. Remove the Screen Frame top section by removing 4 screws (a).
3. Carefully grasp the Lenticular Screen and Fresnel Lens combination and pull upward and out of the Screen Frame Assembly.

Note: When separating the Lenticular Screen from the Fresnel Lens, use caution while prying the Screen and Lens apart. Use a slot type screw drive, and remove the pressure sensitive double sided tape.

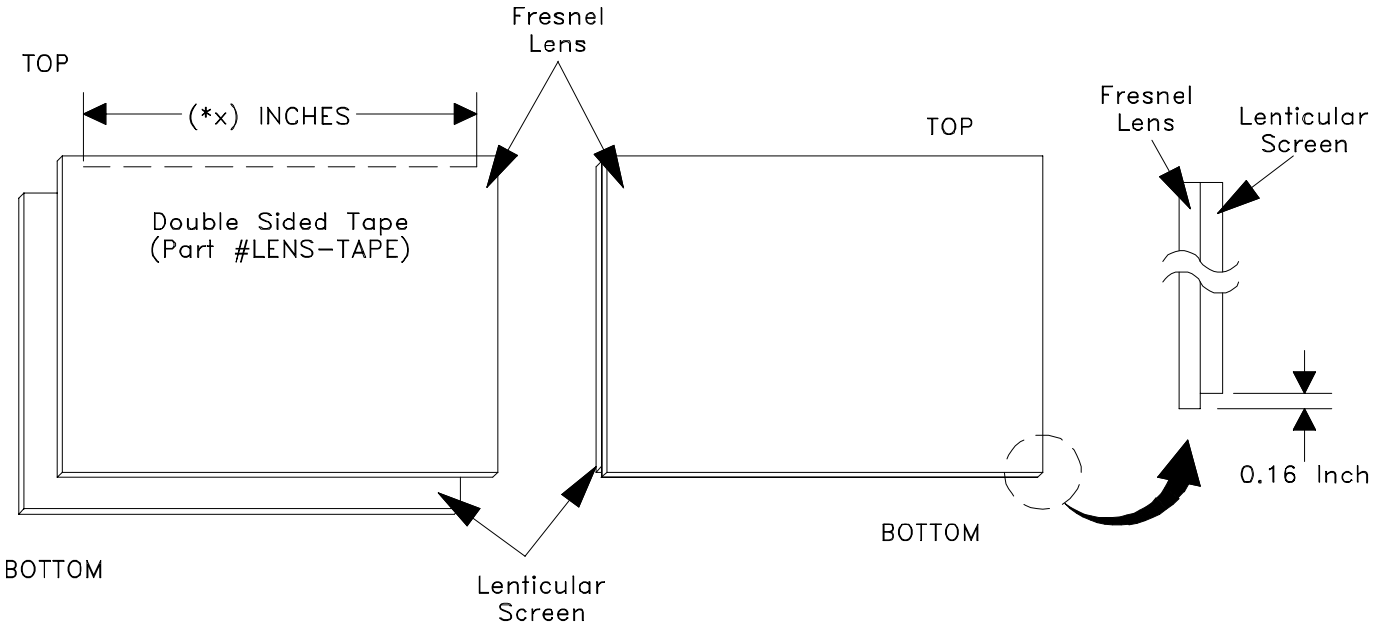


SERVICING THE LENTICULAR SCREEN AND FRESNEL LENS

2. Lenticular Screen and Fresnel Lens Installation.

Note: Store the Lenticular Screen and Fresnel Lens in a cool dry place. High humidity may deform the Lenticular Screen and Fresnel Lens.

1. Apply double coated tape (Part # LENS-TAPE) along the top front edge of the Fresnel Lens as shown below. Refer to the Table below for proper tape length.
2. Place the Fresnel Lens on top of the Lenticular Screen and apply pressure at the top edge to bond them together as shown below.



Model	Screen Size	Tape Length
WS-55859	55"	47.8"
WS-55909	55"	47.8"
WS-65869	65"	56.5"
WS-65909	65"	56.5"
WS-73909	73"	63.5"

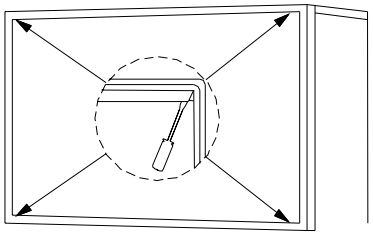
SERVICING THE DIAMONDSHIELD™

1. DiamondShield™ Removal Procedure

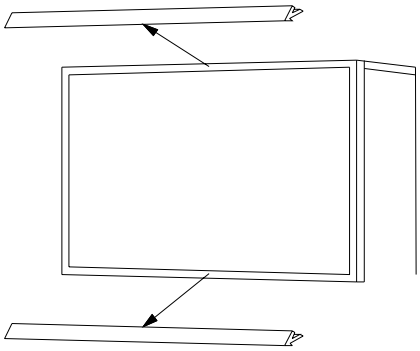
The location of the DiamondShield™ molding clips varies between models, top and bottom, or sides. Use the appropriate disassembly procedure given below.

Note: ***Wear gloves when handling the DiamondShield™ to prevent finger prints.***

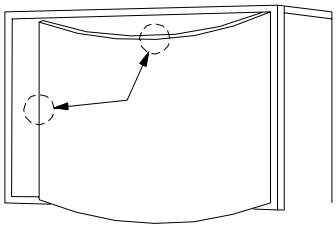
Top & Bottom Molding Clips



1. Gently insert a small screwdriver between the DiamondShield™ and one end of the clip to pry the clip loose.

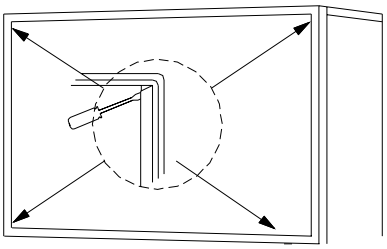


2. Remove both clips by pulling them toward you.

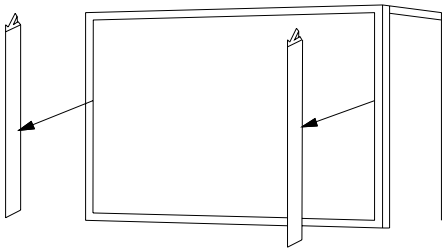


3. Carefully insert a small screwdriver into the gap at the top/center point of the Shield and pull the Shield slightly away from the unit. Place your hands at the points shown and gently bow the Shield toward you and remove from the unit. Then re-install the two clips.

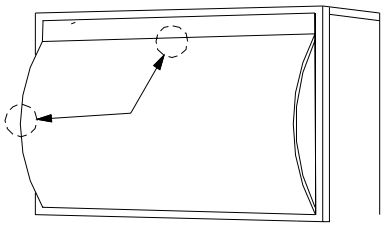
Side Molding Clips



1. Gently insert a small screwdriver between the DiamondShield™ and one end of the clip to pry the clip loose.



2. Remove both clips by pulling them toward you.



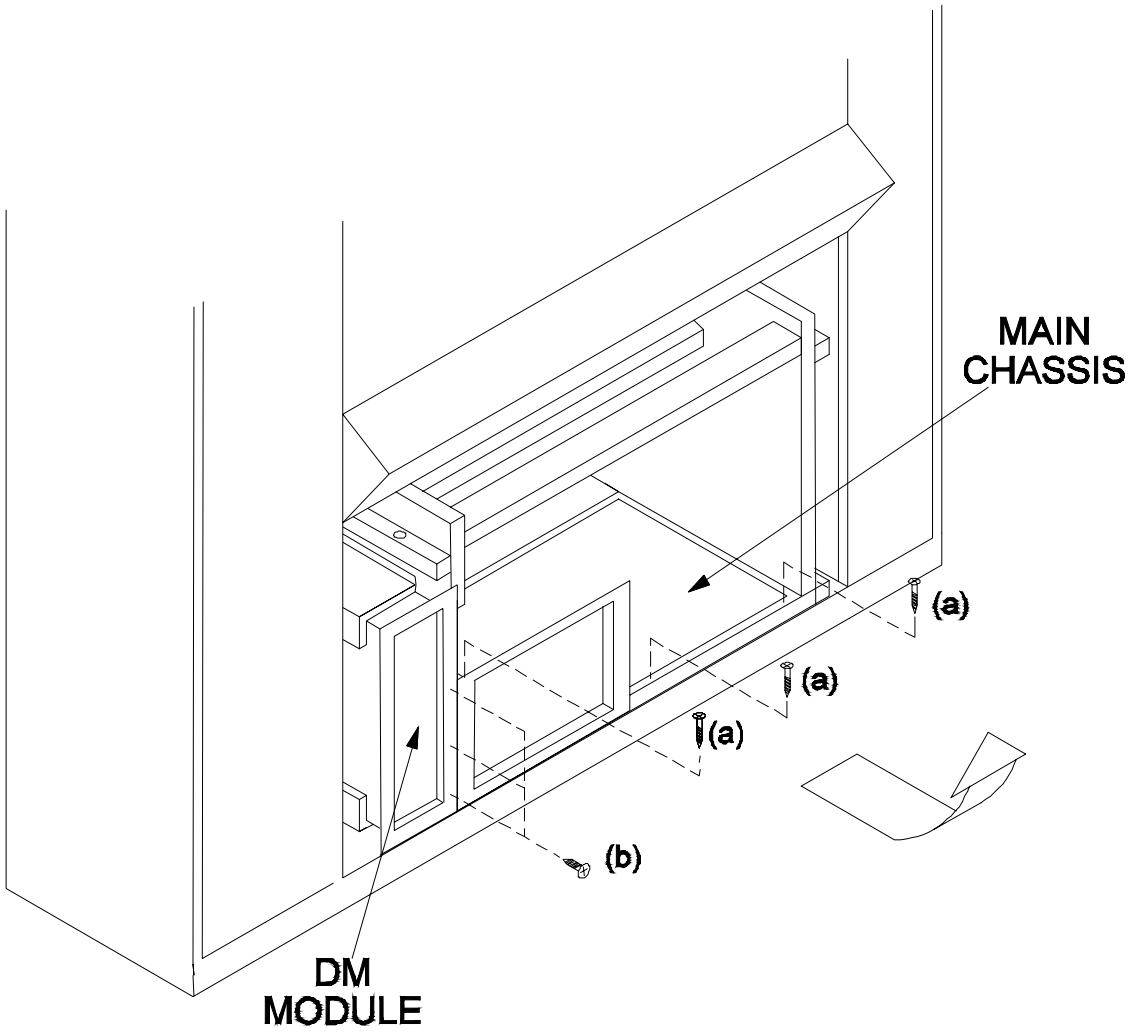
3. Carefully insert a small screwdriver into the gap at the side/center point of the Shield and pull the Shield slightly away from the unit. Place your hands at the points shown and gently bow the Shield toward you and remove from the unit. Then re-install the two clips.

2. DiamondShield™ Installation Procedure

*(See the Parts List for DiamondShield™ part numbers)

To install the DiamondShieldTM, reverse the above Removal Procedure.

Main Chassis Removal



Chassis and DM Module Removal

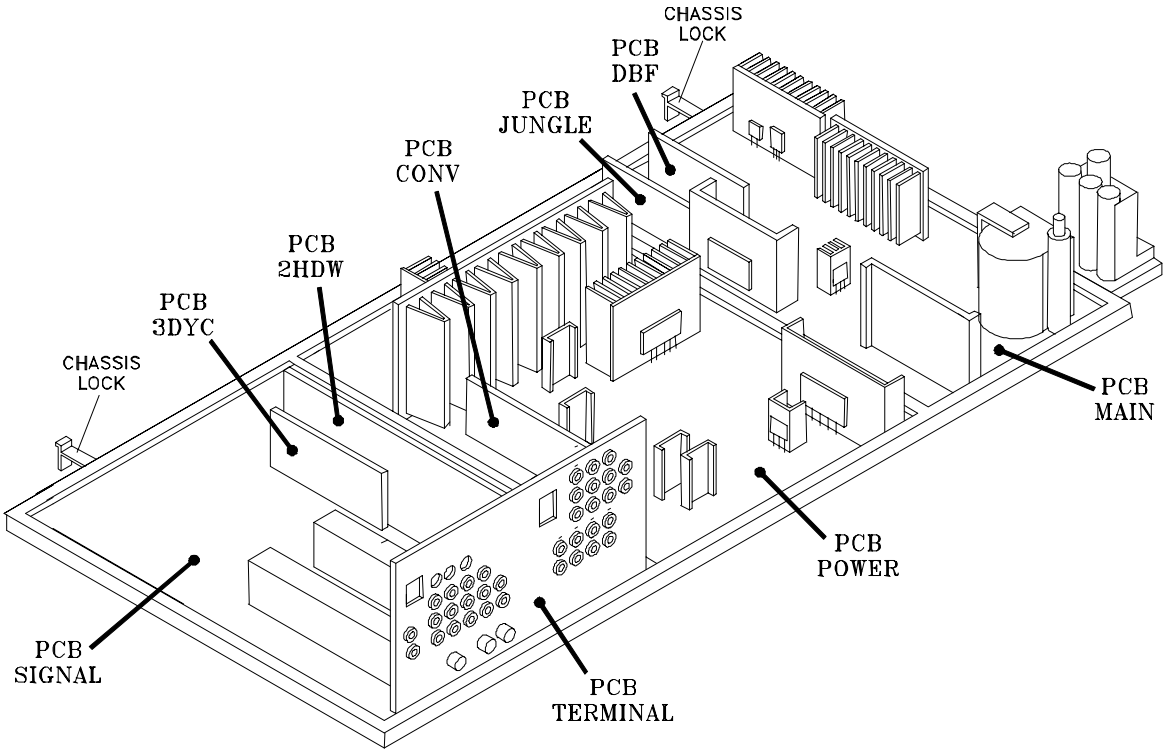
The chassis and DM Module can be removed as a single unit.

1. Undo the cable wire ties to the Front Panel, Speakers, CRTs, etc.
2. Remove 3 screws (a) securing the Main Chassis.
3. Unlatch the two chassis locks on the front of the chassis.
4. Slide the Chassis and DM Module out the rear of the unit.
5. Tilt upward to access the bottom of the main chassis.

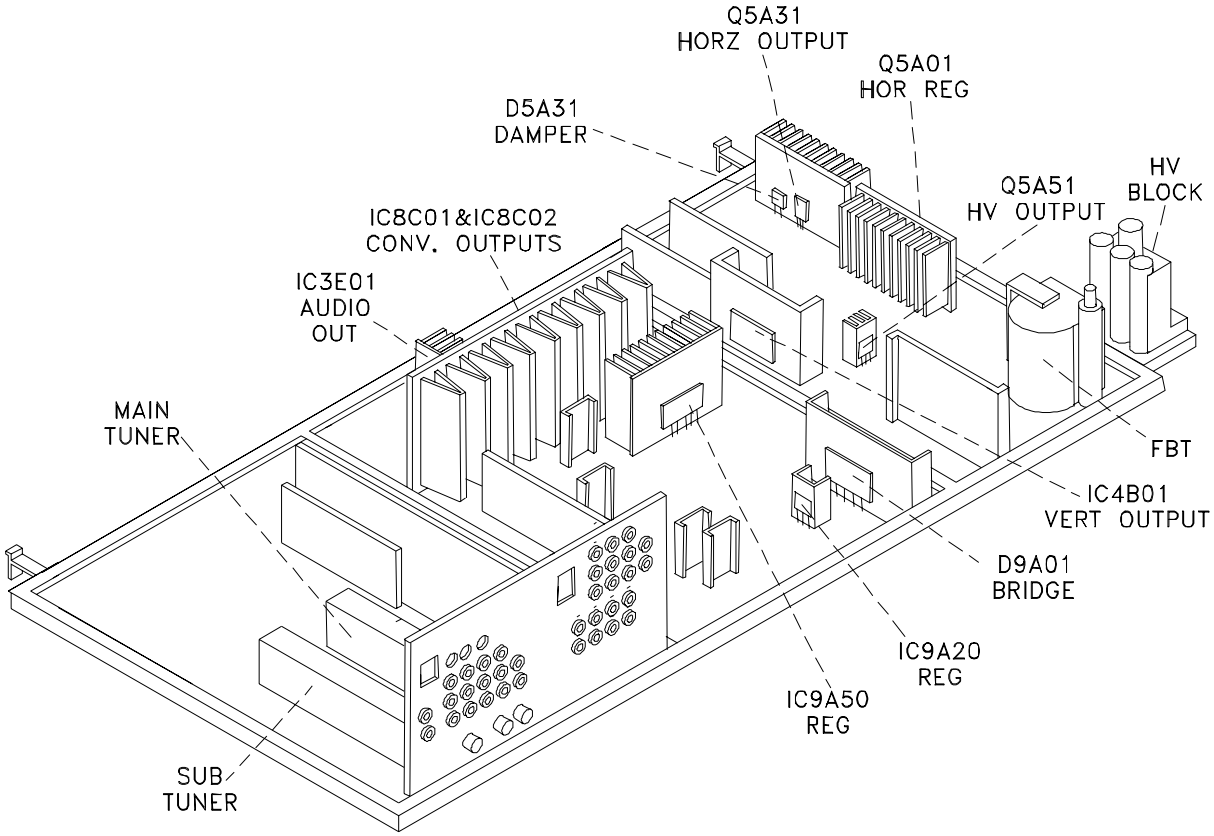
NOTE: If the chassis cannot be removed with the DM Module, due to insufficient cable length:

1. Perform Step 1 through 3 above.
2. Remove 3 screws (b).
3. Slide the chassis only out the rear of the unit.

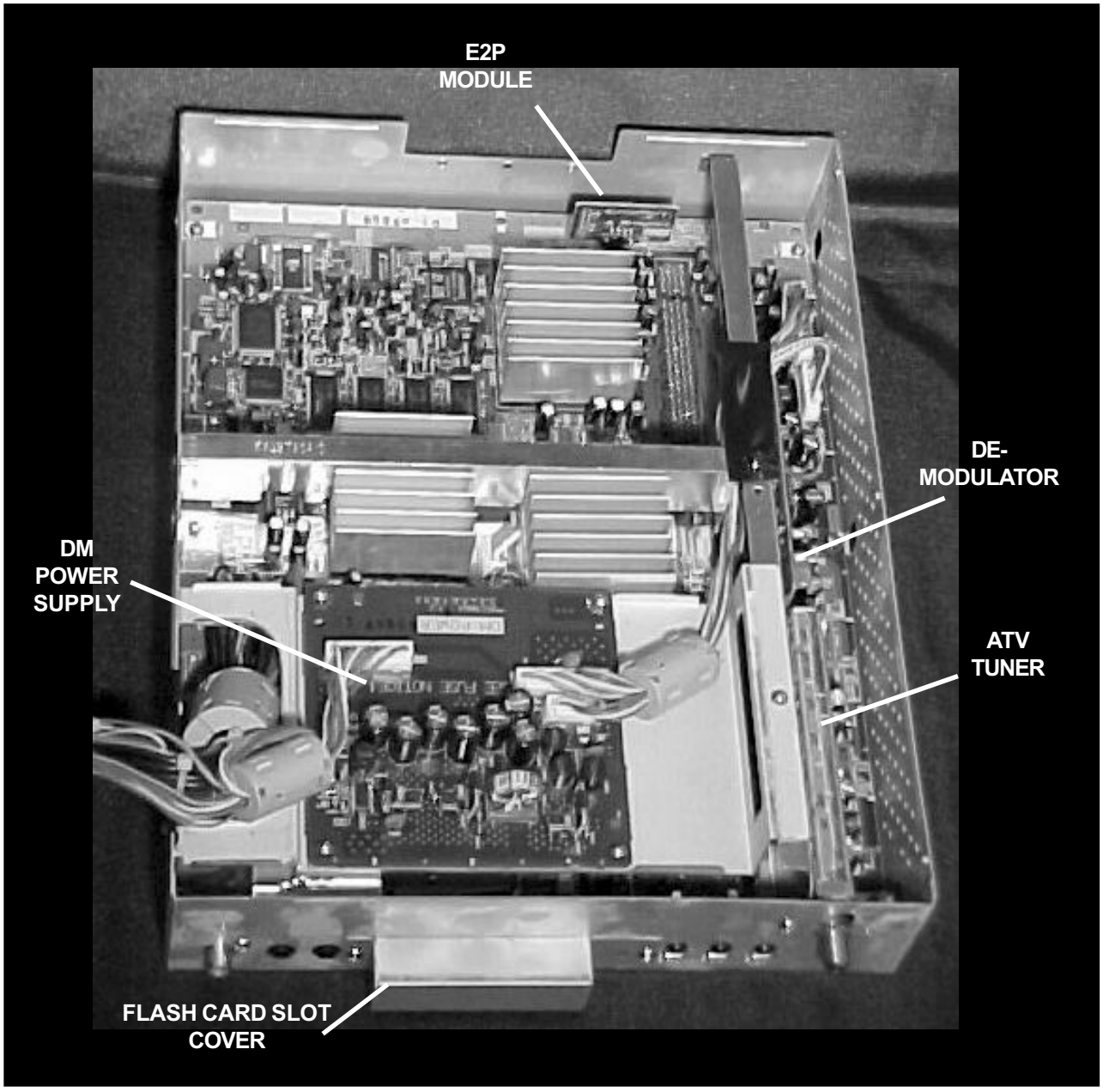
PCB Locations



Main Components Location



DM Module Main Components Location



CRT REPLACEMENT

1. Removal of the CRT

Caution! High voltage should be completely discharged prior to CRT removal. Since The CRTs receive high voltage from the HV Block, discharge by shorting the open end of the respective high voltage cable to chassis ground.

Note: Refer to the Cabinet Disassembly Procedures when performing steps 1 through 4.

1. Remove the Speaker Grille, Front Board, and Screen Assy.
2. Remove the Back Board.
3. Remove the Anode Lead Wire from the CR Block.
4. Remove the PCB-CRT.
5. Remove 4 hex-screws "a" retaining the Optical Unit. [Figure 5-1]
6. Remove 4 screws "b" retaining the Lens.

Note: DO NOT loosen the RED screws. Doing so will break the seal between the C-Element and the # 6 Lens, causing leakage of the CRT Coolant.

7. Remove 4 screws "c" retaining the CRT. [Figure 5-2]
8. Remove the Deflection Yoke from the neck of the CRT. [Figure 5-7]

Figure 5-1

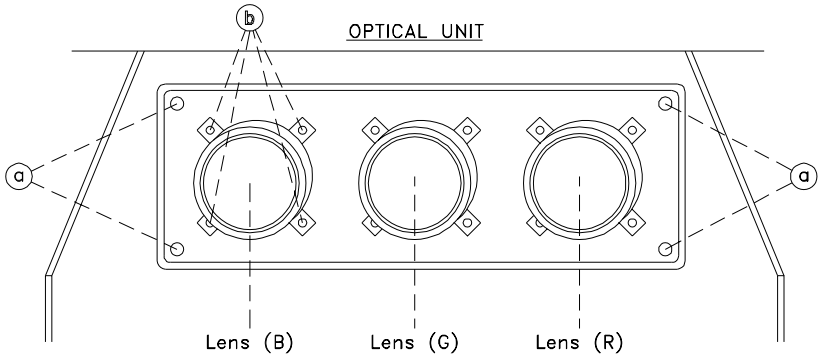
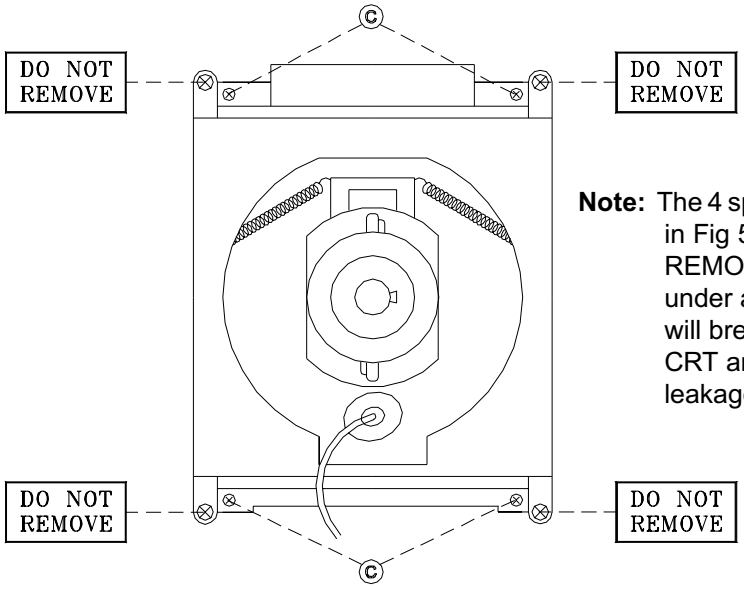


Figure 5-2



Note: The 4 spring-loaded screws shown in Fig 5-2 and labeled as "DO NOT REMOVE", should not be loosened under any circumstance. Doing so will break the seal between the CRT and the CRT-Spacer, causing leakage of the CRT Coolant.

2. Installation of the CRT

Note: The replacement CRT is supplied as an assembly comprised of the CRT and the Inner Lens with the space between them filled with ethylene glycol. Care should be taken during handling and installation to prevent shock from disrupting the seal or alignment between the CRT and Inner Lens. [Figure 5-3]

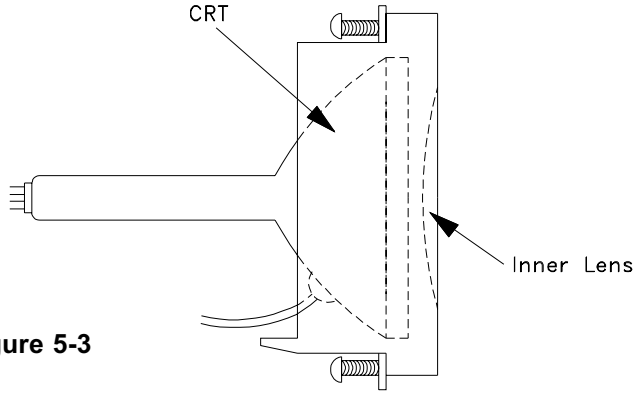


Figure 5-3

Note: The CRT fixing screws should not be loosened nor should they be removed. [Figure 5-4]

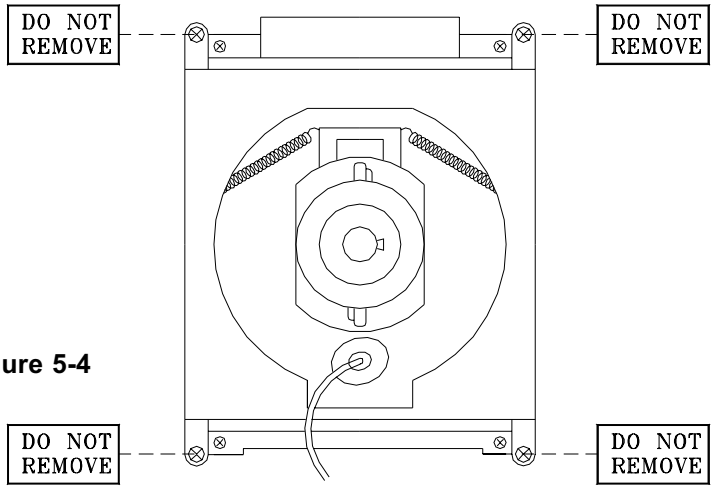


Figure 5-4

1. Carefully position the replacement CRT and fasten in place using 4 screws "d". [Figure 5-6]

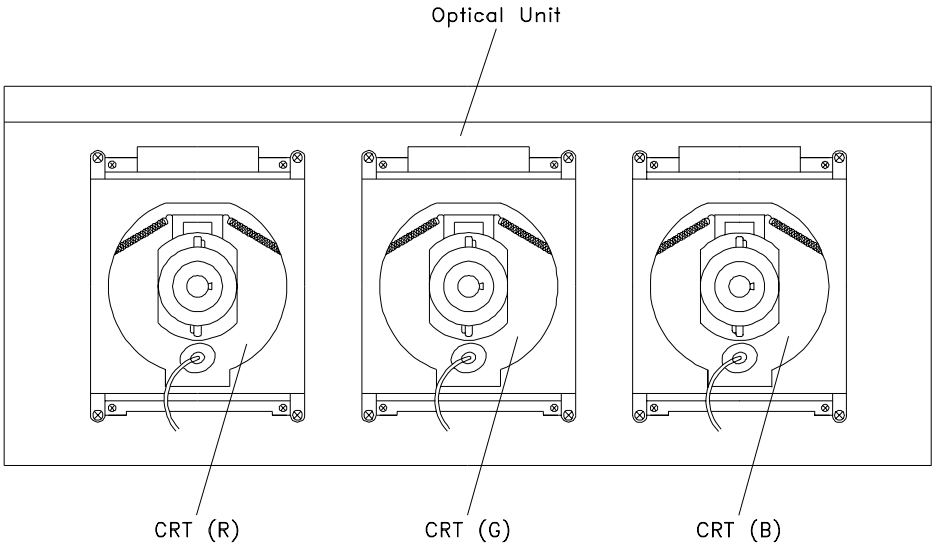


Figure 5-5

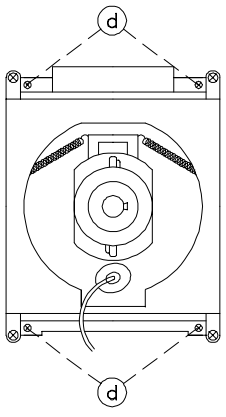


Figure 5-6

2. Install the Deflection Yoke on the CRT neck. [Figure 5-7]
3. Install the Lens that was removed in steps 8 and 9 of Removal Of The CRT. [Figures 5-1 and 5-2]
    a) Position the Lens so that the Label faces the direction shown in Figure 5-8.
    b) Install the mounting screws. [Figure 5-1]
4. Connect the PCB-CRT.
5. Insert the Optical Unit into the Light Box Assembly.
6. Insert the Anode Lead Wire into the Flyback Transformer.
7. Re-clamp the Lead Wire in its original position.

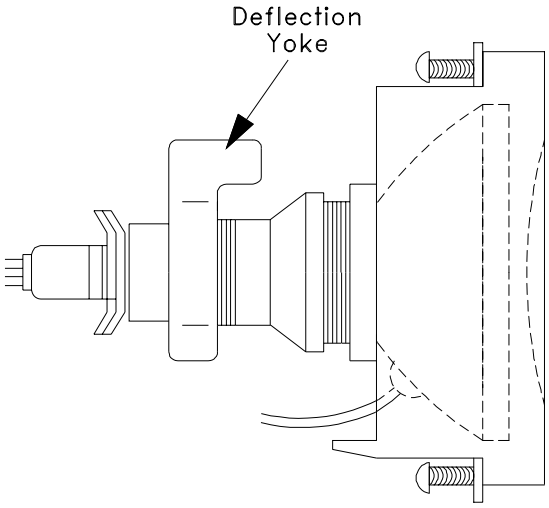


Figure 5-7

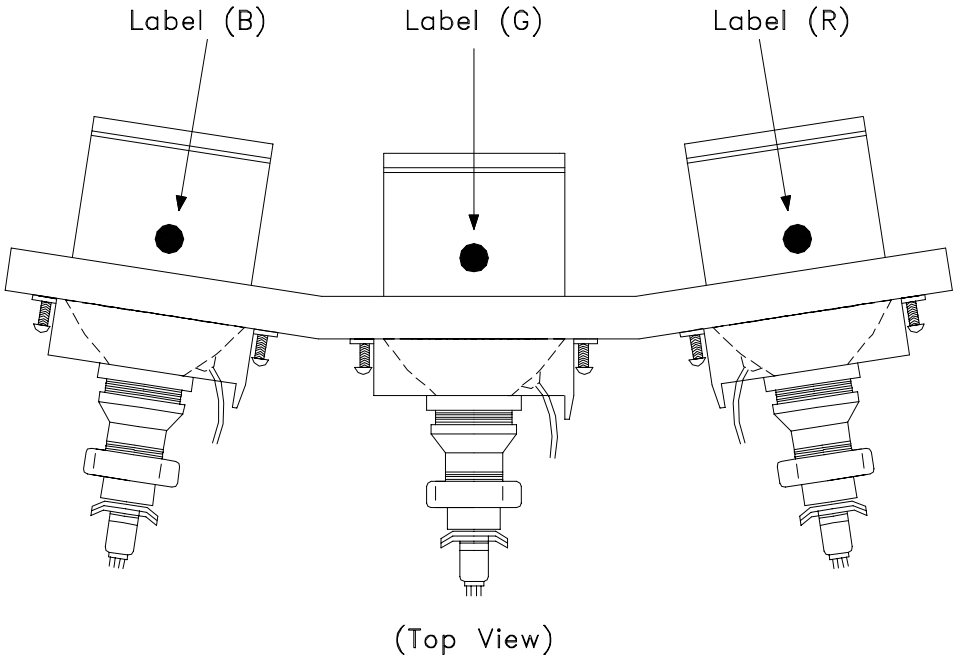


Figure 5-8

Adjustment procedures after replacing the CRT(s)

- CRT Cut Off / White Balance Adjustment
- Static Convergence Adjustment
- Dynamic Convergence Adjustment

ELECTRICAL ADJUSTMENTS

Note: Perform only the adjustments required.
Do not attempt an alignment if proper equipment is not available.

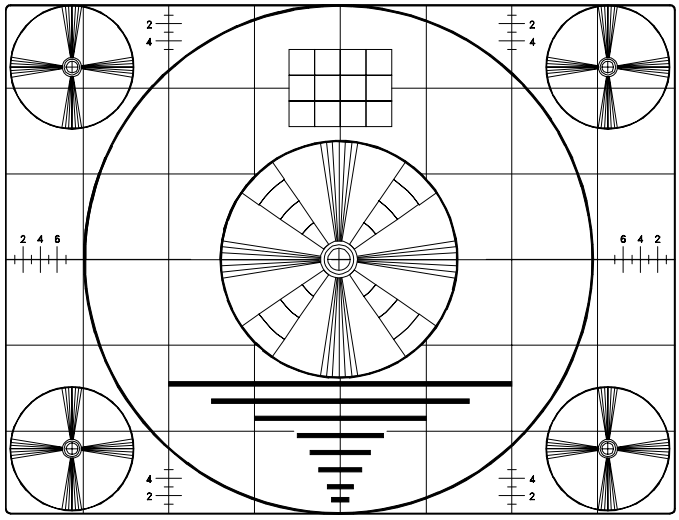
Test Equipment

- Oscilloscope (Unless otherwise specified, use 10:1 probes)
- Signal Generator (both SD and HD capable)
- Frequency Counter
- Direct Current Voltmeter
- Direct Current Power Supply
- Multiplex Audio Signal Generator
- Direct Current Ampere Meter

Test Signal

A. Monoscope Signal

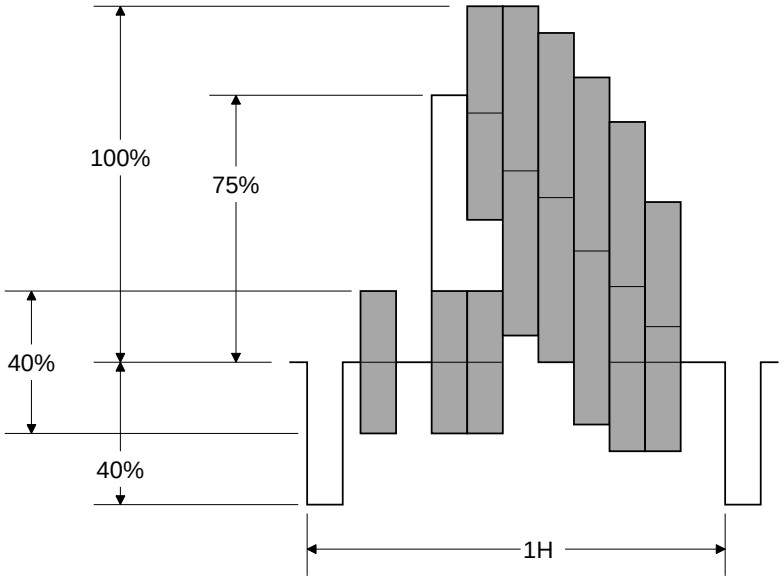
Note: If you do not have a monoscope signal source, connect the unit to a VCR and play a Monoscope *alignment tape.
(* Part Number: 859C568060)



Monoscope Signal

B. Color Bar Signal

Use the color bar signal shown below, unless otherwise specified in this manual.



Split-Field Color Bars (100% window)

Initial Setup

A. Option Menu Setup

Follow the steps below for the initial set-up:

1. Select the "MENU" display by pressing the "MENU" button once.
2. Press the number buttons "0", "1", "7", "0" in sequence to select the "OPTION MENU" display.
3. Press the "ADJUST" button to select "INITIAL."
4. Press "ENTER."

NOTE: At this time channel 3 is automatically selected.

(MENU-0-1-7-0)

OPTION MENU	
Initial	
Power restore	:OFF
DTV Port	:Auto

B. Default Settings

MAIN MENU DEFAULT SETTINGS

SETUP	
Edit Setup	
Review	
Antenna A	(✓) Enabled
Antenna B	(✓) Enabled
Antenna C	(✓) Enabled
DTV	(✓) Enabled
Input 1	(✓) Enabled
Input 2	(✓) Enabled
Input 3	(✓) Enabled
Input 4	(✓) Enabled
Input 5	(✓) Enabled
Component 1	(✓) Enabled
Component 2	(✓) Enabled
VGA	(✓) Enabled
Icon Position	As above
Transport Menu	On
Language	English
ANTENNA	
Antenna	ANT A
Memorize Channels	Air
Channel	Ch-3
Memory	Deleted
CLOCK	
Clock Setting	Auto
Time Zone	Eastern
Daylight Savings	Applies
Clock Time	N/A
Set Day	N/A
CAPTIONS	
Closed Captions	With Mute
CC Background	Gray
Digital Channel Guide	On
V-CHIP PARENT LOCK	
V-CHIP	Off
TV Rating	TV-PG
FV-Fantasy Violence	(✓) Enabled
D-Sexual Dialog	(✓) Enabled
L-Adult Language	(✓) Enabled
S-Sexual Situation	(✓) Enabled
V-Violence	(✓) Enabled
Program not Rated	(✓) Enabled
Movie Rating	PG
V-CHIP LOCK BY TIME	
V-Chip Start Time	12:00 PM
V-Chip Stop Time	12:00 PM
Lock by Time	Off
Unlock Time	N/A
Front Button Lock	Off
TIMER	
Timer	Off
Set Day	Everyday
Set Time	12:00PM
Device	Ant-A
Channel	Ch-3
AUDIO SETTINGS	
Volume	30%
Bass	50%
Treble	50%
Balance	50%
Surround	Off
Listen to	Stereo
Level Sound	Off
TV Speakers	On
VIDEO SETTINGS	
Contrast	100%
Brightness	50%
Sharpness	50%
Color	50%
Tint	50%
Color Temp.	High
Video Noise	Standard
Image Type	Video
Video Mute	On
Black Enhancement	On
PIP/POP	
Source	Ant A Ch 3
PIP Position	Lower Right
POP Position	Right Half
Format	Stretched
PIP/POP Format	Dble. Window

A/V RESET DEFAULT SETTINGS (By Input)

A/V Memory	Ant A/B	Ant DTV	Inp-DTV	INPUTS 1/2/3/4/5	Component 1/2	VGA	1394 1/2/3
Contrast	Max.	Max.	Max.	Max.	Max.	Max.	Max.
Brightness	Center	Center	Center	Center	Center	Center	Center
Sharpness	Center	Center	Center	Center	Center	N/A	Center
Color	Center	Center	Center	Center	Center	Center	Center
Tint	Center	Center	Center	Center	Center	Center	Center
Color Temp.	High	High	High	High	High	High	High
Video Noise	Standard	N/A	Standard	Standard	Standard	N/A	N/A
Image Type	Video	N/A	Video	Video	Video	N/A	N/A
Bass	Center	Center	Center	Center	Center	Center	Center
Treble	Center	Center	Center	Center	Center	Center	Center
Balance	Center	Center	Center	Center	Center	Center	Center
Surround	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Listen To	Stereo	English	N/A	N/A	N/A	N/A	N/A
Level Sound	OFF	OFF	OFF	OFF	OFF	OFF	OFF

C. A/V Memory

Each of the external inputs has its' own Audio/Video Memory. A change in an A/V setting at a specific input is stored in memory for that specific input.

A/V Reset

1. The front panel AV Reset button initializes all A/V Memories.
2. The AV Reset in the user's menu initializes only the selected input's A/V Memory.

LED Indicator Diagnostics

The "Power ON LED" provides an indication of the sets operation, and the possible cause of a malfunction.

1. Initial Control Circuitry Check

Immediately after the TV is connected to an AC power source:

LED Indications	Conditions	Probable Cause
Off	After AC is applied	Standy Power Supply or TV µPC not running
Fast Blink for 70 sec.	After AC is applied	Normal - DM µPC is booting up
Fast Blink (doesn't stop)	After AC is applied	TV µPC is running, but DM failed to boot up
Slow Blink	Set is Off	Normal - Timer is set for Automatic Turn ON

2. Error Code Operational Check

Pressing the front panel "DEVICE" and "MENU" buttons at the same time, and holding for 5 seconds, activates the Error Code Mode. The LED flashes denoting a two digit Error Code, or indicating no problem has occured since the last Initalization.

Note: The front panel buttons must used, NOT those on the Remote Control.

- The number of flashes indicates the value of the MSD (tens digit) of the Error Code.
- The flashing then pauses for approximately 1/2 second.
- The LED then flashes indicating the value of the LSD (ones digit) of the Error Code.
- The Error Code is repeated a total of 5 times.

  Example: If the Error Code is "24", the LED will flash two times, pause, and then flash four times.

3. Error Codes

The Error Code designations indicating a malfunction, or no malfunction, are listed below:

Error Code	Probable Cause
12	Normal Operation - No Error Detected
21	X-Ray Protect
22	Short Protect
23	Loss of Horizontal Deflection
24	Loss of Vertical Deflection

Remote Control Operational Modes

There are two Remote Hand Unit Operational Modes, "Standard" and "NetCommand™". The Remote is initially in in the "Standard" mode. The "NetCommand™" mode is used when controlling Home Theater devices using NetCommand™. To change the Remote Operational Mode:

- Set the Remote to the TV Layer
- Point the Remote away from the TV.
- To change to "Netcommand™" ... Hold the "Power" button and press "9-3-5" in sequence.
- To change to "Standard" ... Hold the "Power" button and press "0-0-0" in sequence.

Circuit Adjustment Mode

Most of the adjustments can only be performed using the remote hand unit. Many of the adjustments must be performed in both the 480i and 1080i modes. Video/Color adjustments must be performed in the 480i and 1080i modes, and data must be preset in the 480P (DVD) and VGA modes.

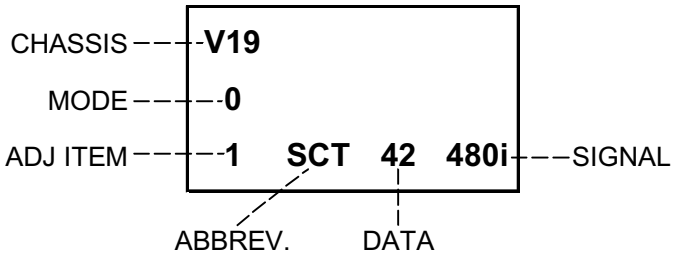
Note: Set the Remote Operational Mode to "NetCommandTM". (Hold the "Power" button and press "9-3-5" in sequence.) This slows the remote's response and makes adjustments easier. When adjustments are complete, **set the Remote to its' original Operational Mode.**

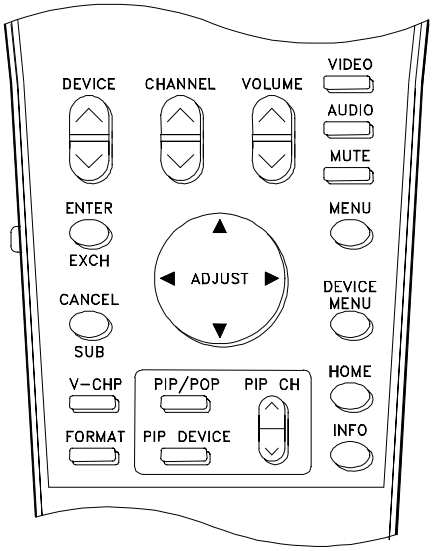
A. Activating the Circuit Adjustment Mode

The current signal source determines if the activated Adjustment Mode is 480i or 1080i.

1. Select the signal source (480i or 1080i).
2. Press the "MENU" button on a remote hand unit.
3. Press the number buttons "0", "1", "5", "7" in sequence. The screen will change to the Adjustment Mode.

Note: Repeat steps 1 and 2 if the circuit adjustment mode does not appear on screen.

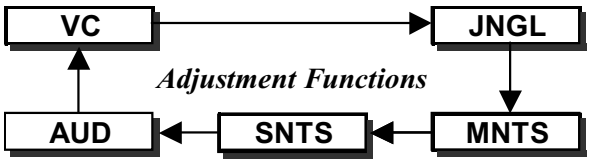




B. Selection of adjustment Functions and Adjustment Items

To select an adjustment item in the circuit adjustment mode, first select the adjustment function that includes the specific adjustment item to be selected. Then select the adjustment item. Refer to the following pages for the listing of adjustment functions and adjustment items.

1. Press the "AUDIO" button on a remote hand unit to select an adjustment function. Each time the button is pressed, the Function changes in the following sequence:



Previous Models	V19 Chassis
Video/Chroma	VC
Jungle	JNGL
Main Matrix	MNTS
Sub Matrix	SNTS
Audio	AUD

Adjustment Function Name Changes

2. Press the "VIDEO" button to select a specific Adjustment Item. The Item number increases each time the "VIDEO" button is pressed.

C. Changing Data

After selecting an adjustment Item, use the "ADJUST UP/DOWN" button to change data.

- Press "ADJUST DOWN" to decrease the data value.
- Press "ADJUST UP" to increase the data value.

D. Saving Adjustment Data

Press "ENTER" to save adjustment data in memory. The character display turns red for approximately one second in this step.

Note: If the circuit adjustment mode is terminated without pressing "ENTER", changes in adjustment data are not saved.

E. Terminating the Circuit Adjustment Mode

Press the “MENU” button on the remote hand unit twice to terminate the adjustment mode.

Note: The circuit adjustment mode can also be terminated by turning power OFF.

F. Toggle Between Reception Modes

Pressing “3” when in the Adjustment Mode VC Function toggles between 480i, 480p, 1080i and VGA. However data changes are not automatically saved. **Press “ENTER” to save data before pressing “3”**.

On Screen Display Position Adjust Mode

Activation

1. Select 480i or 1080i source.
2. Press MENU-0-1-8-8

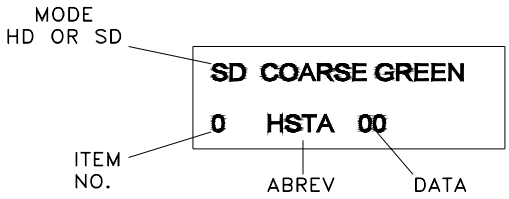
Convergence Adjustment Mode

The Convergence mode is used to perform raster geometry correction, and convergence adjustments. These adjustments must be made in both the SD (NTSC) and HD modes.

Note: Before activating the Convergence mode, turn “Video Mute” Off. The internal crosshatch pattern will not be displayed with “Video Mute” On, only a blue background is displayed.

A. Convergence Mode Activation

1. Press MENU-0-1-5-9
2. When the Convergence Mode is activated, this display appears on a Green Crosshatch.



B. Selecting the HD or SD Mode

1. **Select the Signal Source** before entering the Convergence Mode, either an NTSC or HD source.

2. **Enter the Convergence Mode**
   - If the signal source is NTSC, the SD mode is activated.
   - If the signal source is HD, the HD mode is activated.

3. **Activating the HD mode when no HD signal is available**
   - Press the “DEVICE” button.
   - Use the “UP-DOWN-RIGHT-LEFT” direction buttons to select the ANT-DTV, then press “ENTER”.
   - Press “MENU-0-1-5-9-5” in sequence to activate the Coarse Green HD Convergence mode.

C. Convergence Mode Functions

In the Convergence Mode there are three main Functions (Categories).

- Pressing “6” activates CONV MISC
- Pressing “5” activates COARSE CONV
- Pressing “4” activates FINE CONV

D. CONV MISC (Press 6)

This mode is used to preset data values controlling the Convergence Generator, and to perform the HV Regulation adjustment.

1. Use the VIDEO button to select an item.
2. Use the ADJUST buttons to change data.

NOTE: When Item “1 HVOL” is selected the screen goes black except for the data display. This occurs since a black screen is required when making the HV Regulation adjustment.

E. COARSE CONV (Press 5)

There are four Sub Functions in the Coarse mode, COARSE GREEN, COARSE RED, COARSE BLUE and DF.

- COARSE GREEN .... used to make Coarse Raster Geometry Adjustments.
- COARSE RED ... used to make Coarse Red Convergence Adjustments.
- COARSE BLUE ... used to make Coarse Blue Convergence Adjustments.
- DF ... used to preset data values controlling the Dynamic Beam Focus circuit drive signal.

1. Use AUDIO button to select a Sub Function
2. Use the VIDEO button to select an Adjustment Item.
3. Use the ADJUST buttons to change data.

F. FINE CONV (Press 4)

Sub Functions

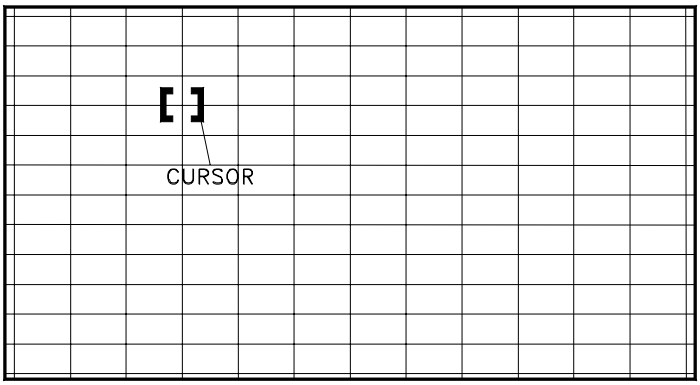
This mode is used to perform Fine Raster Correction, and Fine Red and Blue Convergence Adjustments. There are three Sub Adjustment Functions, selected with the AUDIO button:

- FINE GREEN .... a Green Crosshatch is displayed, to make Fine Raster Corrections.
- FINE RED .... a White Crosshatch is displayed, to make Fine Red Convergence Adjustments.
- FINE BLUE .... a White Crosshatch is displayed, to make Fine Blue Convergence Adjustments.

Cursor

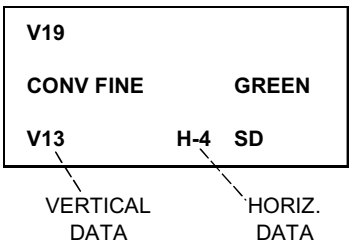
In the Fine mode a Cursor is added to the Crosshatch. The ENTER button toggles the Cursor between two modes:

- MOVE (blinking Cursor) .... use the ADJUST buttons to select any of 64 points on the Crosshatch.
- ADJUST (Non blinking Cursor) .... the ADJUST buttons adjust the active color at the current Cursor position, horizontally or vertically.



Display

The on-screen display changes in the Fine mode, as shown at the right. The display shows the vertical and horizontal data for the current Cursor Position, and the horizontal and vertical coordinates for that position.



G. Saving Data and Exiting the Convergence Mode

Press MENU twice to exit the Convergence mode, data is automatically saved.

E2PROM Replacement

IC7A01 stores some adjustment data. After replacing the IC, set the data to the values given in the following tables. If good performance is not obtained, perform the Adjustments Procedures given in the Notes column.

List of Adjustment Items.

VC Function (Video Color)

IC2V00

Function Display		Adjustment	Data	Initial Data				Notes
NO.	Abbrev.	Description	Range	480i	480p	1080i	VGA	
1	SCT	Picture Gain (H-Temp)	0~63	42	42	42	42	Sub Contrast
2	SBRT	Sub Brightness (H-Temp)	0~63	25	25	25	25	Black Level
3	SCOL	Sub Color (H-Temp)	0~15	3	5	3	3	Preset
4	STIN	Sub Tint	0~15	7	8	15	7	"
5	SCON	Sub Contrast (H-Temp)	0~15	3	3	3	3	"
6	RDRH	R-Drive (high)	0~63	25	25	25	25	White Balance
7	GDR	G-Drive	0~63	35	35	35	35	Preset
8	BDRH	B-Drive (high)	0~63	25	25	25	25	White Balance
9	CTRH	R-Cutoff (high)	0~63	20	20	20	20	"
10	CTGH	G-Cutoff (high)	0~63	55	55	55	55	Preset
11	CTBH	B-Cutoff (high)	0~63	20	20	20	20	White Balance
12	RDRL	R-Drive (low)	0~63	30	30	30	30	"
13	BDRL	B-Drive (low)	0~63	20	20	20	20	"
14	CTRL	R-Cutoff (low)	0~63	20	20	20	20	"
15	CTGL	G-Cutoff (low)	0~63	55	55	55	55	"
16	CTBL	B-Cutoff (low)	0~63	15	15	15	15	"
17	SCTL	Picture Gain (L-Temp)	0~63	42	42	42	42	Preset
18	SBRL	Sub Brightness (L-Temp)	0~63	25	25	25	25	User
19	SCLL	Sub Color (L-Temp)	0~15	2	2	2	2	User
20	SCNL	Color Gain (L-Temp)	0~15	2	2	2	2	"
23	COL	Color Gain	0~63	31	31	31	31	
56	VM	VM level	0~3	2	2	2	0	"
60	CRO1	CR Offset 1	0~15	10	7	7	7	Cb Cr Offset
61	CBO1	CB Offset 1	0~15	10	7	7	7	Cb Cr Offset
64	R-YR	R-Y gain of R-Y	0~15	7	7	7	7	Preset
65	R-YB	R-Y gain of B-Y	0~15	2	2	2	2	"
66	G-YR	G-Y gain of R-Y	0~15	8	8	8	8	"
67	G-YB	G-Y gain of b-y	0~15	11	11	11	11	"
72	AG-1	White Aging, On/Off	0~1	1	1	1	1	"

JNGL Function (Jungle)

IC4A01

Function Display		Adjustment	Data	55" Data		65" Data		73" Data		Notes
Item #	Abbrev.	Description	Range	1080i	480i	1080i	480i	1080i	480i	
1	HWID	Horizontal Width	0~63	33	33	33	33	36	33	Width
2	HKEY	Horizontal Keystone	0~63	31	31	31	31	31	31	Preset
3	EWPT	EW-PCC on top	0~63	22	22	22	22	22	16	"
4	EWCT	Corner Pin (top)	0~63	31	28	31	28	31	31	
5	EWPB	EW-PCC on bottom	0~63	27	31	27	31	27	21	"
6	EWCB	Corner Pin (bottom)	0~63	31	31	31	31	31	27	
7	VHGT	Vertical Height	0~63	25	27	25	27	32	32	Height
8	VLIN	Vertical Linearity	0~15	9	9	9	9	9	9	Preset
9	VSCN	Vertical S-Correction	0~15	0	0	0	0	0	0	"
10	VLNT	Vertical Lin. (Top)	0~15	0	0	0	0	0	0	"
11	VLNB	Vertical Lin. (Bottom)	0~15	0	0	0	0	0	0	"
14	H-POS	Horizontal Position	0~63	30	37	30	37	30	37	"
20	V-POS	Vertical Position	0~63	31	31	31	31	31	31	"

MNTS Function (Main Decoder)

IC2E00

Function Display		Adjustment	Data	Initial Data		Notes
Item #	Abbrev.	Description	Range	RF	Non RF	
1	TNTM	Main Tint	0~63	27	29	Preset
2	COLM	Main Color	0~63	19	19	"
3	YDRM	Main Gain Control	0~31	9	9	Main Y Level
4	VPDM	Pr Pedestal Adjustment	0~15	7	7	
5	UPDM	Pb Pedestal Adjustment	0~15	7	7	

SNTS Function (Sub Decoder)

IC2H00

Function Display		Adjustment	Data	Initial	Notes
Item #	Abbrev.	Description	Range	Data	
1	TNTS	Sub Tint	0~63	29	Preset
2	COLS	Sub Color	0~63	27	"
3	YDRS	Sub Gain Control	0~31	12	Sub Y Level
4	VPDS	Pr Pedestal Adjustment	0~15	7	"
5	UPDS	Pb Pedestal Adjustment	0~15	7	"

AUDIO Function

IC3A01

Function Display		Adjustment	Data	Initial	Notes
Item #	Abbrev.	Description	Range	Data	
1	INP	Input Level Alignment	0~15	8	Input Level
2	WDE	Wideband Separator Align.	0~31	3	Separation
3	SPC	Spectral Separator Align.	0~31	3	"

OSD Horizontal Centering

(MENU-0-1-8-8)

Abbrev.	Description	Data Range	Initial Data
OSDHD	HD OSD Horizontal Position	0~960	122
OSDSD	SD OSC Horizontal Position	0~960	120

DYNAMIC FOCUS

(MENU-0-1-5-9)

Item Number	Abbrev. Name	Description	Data SD&HD
0	DFH	Dynamic Focus Horizontal	-300
1	DFV	Dynamic Focus Vertical	-100

CONV MISC

(MENU-0-1-5-9-6)

Item Number	Abbrev. Name	Data		Notes
		SD	HD	
1	HVOL	160		HV Adj.
2	VCNT	29	29	Preset
3	VSTR	0	0	"
4	VOFS	25	0	"
5	STLN	45	34	"
6	FPHS	288	288	"
7	CPHS	15	15	"
8	HOFS	22	22	"
9	DPHS	0	0	"
10	DOFS	63	63	"
11	TPHS	34	36	"
12	TPVD	27	39	"
13	ODEV	200	125	"
14	HRTC	1	1	"
15	DRTC	1	1	"
16	DAC	1	1	"
17	EPWP	0	0	"
18	SCRL	25	25	"
19	SDEL	600	600	"
20	FDEL	3	3	"

* Do not change "1 HVOL" if it has been previously set.

CONV GREEN Items

(MENU-0-1-5-9-5)

No.	Abbrev. Name	Description	WS-55859		WS-55909		WS-65869		WS-65909		WS-73909	
			SD	HD	SD	HD	SD	HD	SD	HD	SD	HD
1	HSTA*	Horizontal Position	0	0	0	0	0	0	0	0	0	0
2	VSTA*	Vertical Position	0	0	0	0	0	0	0	0	0	0
3	SKEW	Skew (Y axis rotation)	0	0	0	0	0	0	0	0	0	0
4	TILT	Tilt (X axis rotation)	0	0	0	0	0	0	0	0	0	0
5	HWID	Horisontal Width	0	0	0	0	0	0	0	0	0	0
6	HLIN	Horizontal Linearity	0	0	0	0	0	0	0	0	0	0
7	SPCC	Side Pin Cushion Correction	0	0	0	0	0	0	0	0	0	0
8	HKEY	Horizontal Keystone	0	0	0	0	0	0	0	0	0	0
9	TBPC	Top/Bottom PC Correction	-200	-170	-200	-170	-200	-170	-200	-170	-200	-170
10	VKEY	Vertical Keystone	15	15	15	15	15	15	15	15	15	15
11	VWID	Vertical Height	0	0	0	0	0	0	0	0	0	0
12	VLIN	Vertical Linearity.	0	0	0	0	0	0	0	0	0	0

***HSTA and VSTA must not exceed ±200**

CONV RED Items

(MENU-0-1-5-9-5)

No.	Abbrev. Name	Description	WS-55859		WS-55909		WS-65869		WS-65909		WS-73909	
			SD	HD	SD	HD	SD	HD	SD	HD	SD	HD
1	HSTA	Horizontal Position	50	50	50	50	50	50	50	50	50	50
2	VSTA	Vertical Position	0	0	0	0	0	0	0	0	0	0
3	SKEW	Skew (Y axis rotation)	0	0	0	0	0	0	0	0	0	0
4	TILT	Tilt (X axix rotation)	0	0	0	0	0	0	0	0	0	0
5	HLIN	Horixontal Linearity	-150	-150	-150	-150	-150	-150	-150	-150	-200	-150
6	HWID	Horizontal Width	10	10	10	10	10	10	10	10	10	10
7	VKEY	Vertical Keystone Correction	-90	-90	-90	-90	-90	-90	-90	-90	-100	-90
8	VWID	Vertical Height	0	0	0	0	0	0	0	0	0	0
9	VLIN	Vertical Linearity	0	0	0	0	0	0	0	0	0	0
10	TPPC	Top/Bottom PC Correction	20	20	20	20	20	20	20	20	20	20
11	SDBW	Horizontal Side Bow	30	30	30	30	30	30	30	30	30	30

***HSTA and VSTA must not exceed ±200**

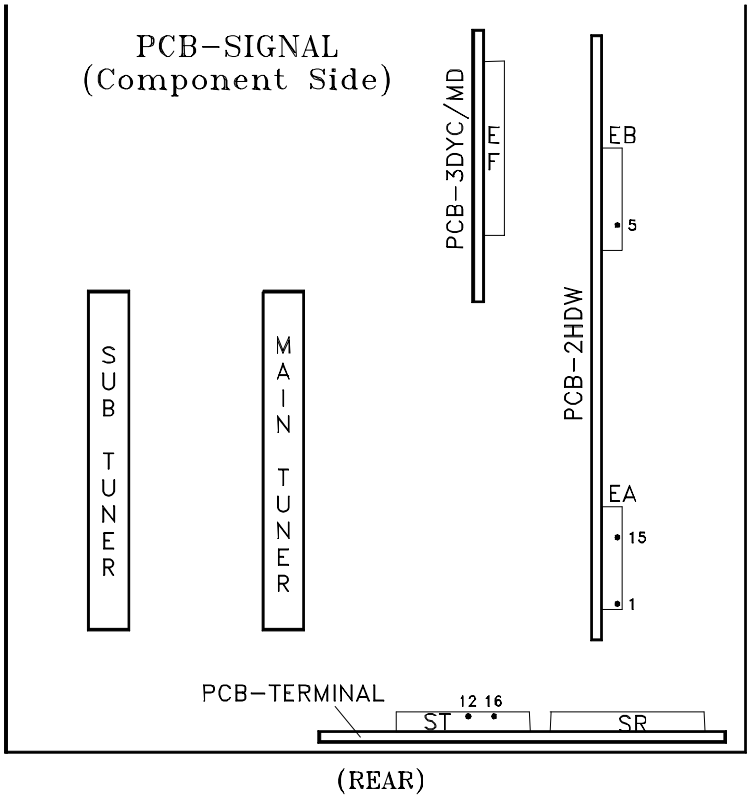
CONV BLUE Items

(MENU-0-1-5-9-5)

No.	Abbrev. Name	Description	WS-55859		WS-55909		WS-65869		WS-65909		WS-73909	
			SD	HD	SD	HD	SD	HD	SD	HD	SD	HD
1	HSTA	Horizontal Position	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
2	VSTA	Vertical Position	0	0	0	0	0	0	0	0	0	0
3	SKEW	Skew (Y axis rotation)	0	0	0	0	0	0	0	0	0	0
4	TILT	Tilt (X axix rotation)	0	0	0	0	0	0	0	0	0	0
5	HLIN	Horixontal Linearity	160	150	160	150	160	150	160	150	220	150
6	HWID	Horizontal Width	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20
7	VKEY	Vertical Keystone Correction	70	70	70	70	70	70	70	70	80	70
8	VWID	Vertical Height	0	0	0	0	0	0	0	0	0	0
9	VLIN	Vertical Linearity	0	0	0	0	0	0	0	0	0	0
10	TPPC	Top/Bottom PC Correction	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20
11	HSBW	Horizontal Side Bow	-30	-30	-30	-30	-30	-30	-30	-30	-30	-30

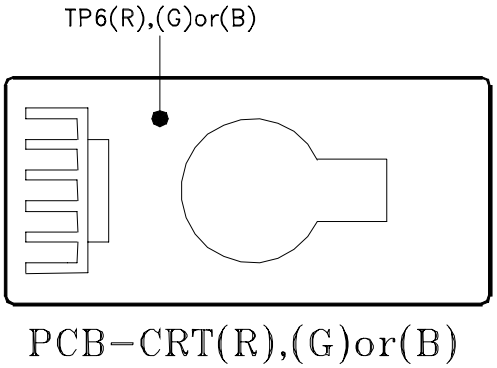
***HSTA and VSTA must not exceed ±200**

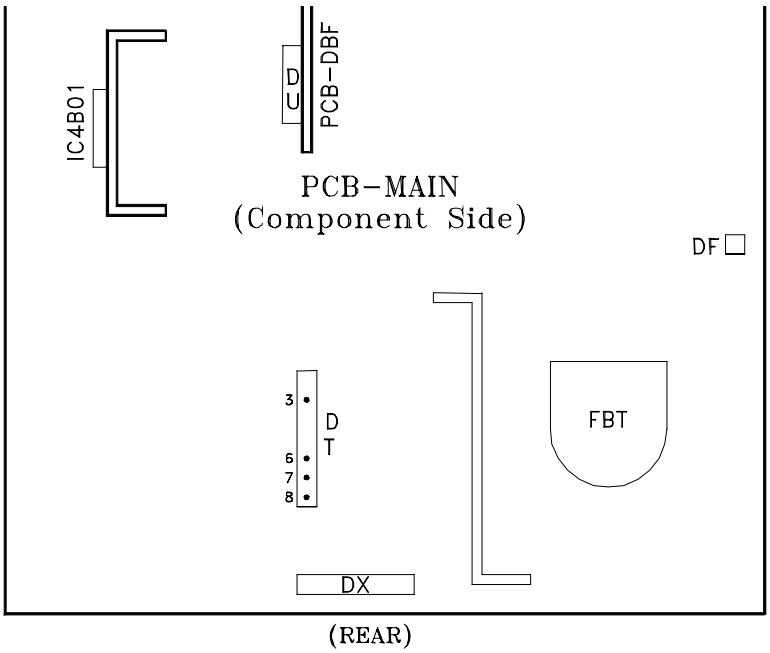
Adjustment Test Point Location



Test Points

DT pin 3 - HV Adjust
DT pin 6 - Ground
DT pin 7 - 12 Volts
DT pin 8 - ACL
EA pin 1 - Sub Picture (Y)
EA pin 15 - Main Picture (Y)
EB pin 5 - POP (Cr)
ST pin 12 - Left Audio
ST pin 16 - Right Audio
TP6(R, G or B) - CRT Cathode





[Audio Circuit]

1. MCS Input Level

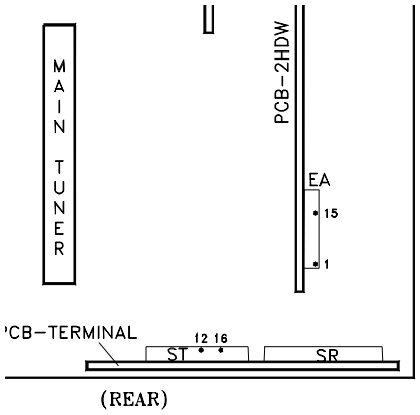
Purpose: Check the input signal level to the MCS circuit

Symptom: Distorted sound during a stereo broadcast.

Measuring Instrument	Oscilloscope
Test Point	Connector ST pins 16&12
Ext. Trigger	------
Measuring Range	50mV/Div
Input Signal	RF Stereo 300 Hz modulation
Input Terminal	RF Input

1. Supply an RF MCS signal to the Ant A input, 300 Hz at 100% modulation (25 kHz deviation) for right and left channels.
2. Connect the oscilloscope to connector ST pin 16 (Right Audio).
3. Enter the Adjustment Mode and select the Audio Function.
4. Verify that the Audio Function items are set to the data values given the table below.
5. Set the data for Item “1 INP” for 1.56 Vp-p ±0.06V.
6. Connect the oscilloscope to connector ST pin 12 (Left Audio).
7. Confirm that the left audio level at pin 12 of the ST connector is 1.56 Vp-p ±0.06V.

Note: *Adjustment 2 (Stereo Separation) must be performed after this adjustment)*



CIRCUIT ADJUST MODE

Activate …….. MENU-0-1-5-7
Function ……..……..AUDIO
Item No. ……..……VIDEO
Adjust Data ……..ADJUST
Save Data …. ……ENTER
Exit ……..MENU (twice)

AUDIO Function

Item #	Abbrev.	Data
1	INP	8
3	WDE	3
4	SPC	3

[Audio Circuit]

2. Separation

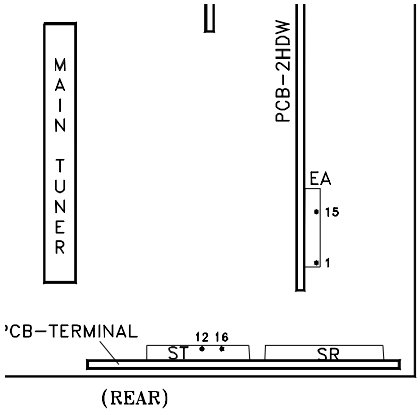
Purpose Check stereo separation

Symptom: Poor stereo separation

Measuring Instrument	Oscilloscope
Test Point	Conector ST pin 16
Ext. Trigger	------
Measuring Range	10mV/Div
Input Signal	RF Stereo
Input Terminal	RF Input

Note: *This adjustment must follow Adjustment 1 (Input Level)*

1. Supply a RF Stereo Signal (dual tone stereo) to the Ant. A input.
   - Left Channel = 300 Hz modulation
   - Right Channel = no modulation
2. Connect the oscilloscope to connector ST pin 16 (Right Audio).
3. Enter the Adjustment Mode and select the Audio Function.
4. Set the data for Item “3 WDE” for minimum Right Audio signal.
5. Change the modulation frequency to 3kHz.
6. Adjust the data for Item “4 SPC” for minimum Right Audio signal.



CIRCUIT ADJUST MODE

Activate …….. MENU-0-1-5-7
Function ……..……..AUDIO
Item No. ……..……VIDEO
Adjust Data ……..ADJUST
Save Data …. ……ENTER
Exit ……..MENU (twice)

[HV Circuit]

3. HV Regulation

Purpose: To set the CRT Anode voltage.

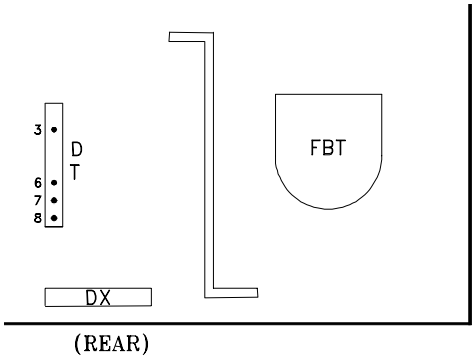
Symptom: Dark Picture

Measuring Instrument	DC Voltmeter
Test Point	DT connector pins 3 & 6
Ext. Trigger	------
Measuring Range	-------
Input Signal	Video Signal Monoscope
Input Terminal	Video Input

Note: *This adjustment must be rechecked following Adjustment 9 CRT Cutoff.*

1. Supply a video monoscope signal.
2. Sent Contrast to maximum, and Brightness to mid position.
3. Connect a DC volt meter between pins 3 and 6 of the DT connector. (Positive lead to pin 3)
4. Activate the Conv-Misc Mode.
5. Select Item "1 HVOL" (screen goes black).
6. Adjust Item "1 HVOL" for 15.4V ±0.1V on the meter.
7. Save data and exit the Conv-Misc mode.
8. Confirm that the voltage does not change more than 0.15V.

Note: *This adjustment must be performed if E2RESET or Convergence E2RESET are activated.*



CONVERGENCE MODE

Activate ……..MENU-0-1-5-9
Misc. ……."6"
Coarse……."5"
Fine ……."4"
Color (R,G or B)……AUDIO
Item No……VIDEO
Adjust/Move…….ADJUST
Cursor Toggle……..ENTER
Save & Exit…..MENU (twice)

[Video Circuit]

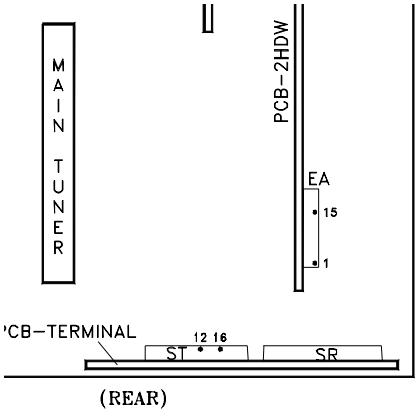
4. Main/Sub Y Level

Purpose To set picture luminance

Symptom: Excess or insufficient brightness.

Measuring Instrument	Oscilloscope
Test Point	EA connector pins 15 & 1
Ext. Trigger	------
Measuring Range	------
Input Signal	Color Bars
Input Terminal	Video Input

1. Supply a color bar signal to a Video Input (not an RF input).
2. Select the color bar signal for both the main and sub pictures.
3. Connect the oscilloscope to connector EA pin 15.
4. Activate the Adjustment Mode
5. Select Item "3 YDRM" in the MNTS function.
6. Adjust the data for 0.7 Vp-p max. - 0.67 Vp-p min. at EA pin 15. (If it cannot be adjusted within this range, set to the lower value)
7. Move the oscilloscope to EA pin 1.
8. Select Item "3 YDRS" in the Sub Matrix function.
9. Adjust the data to equal the MAIN-Y Gain (+0.01V -0.04V).



CIRCUIT ADJUST MODE

Activate …….. MENU-0-1-5-7
Function ……..AUDIO
Item No. ……..VIDEO
Adjust Data ……ADJUST
Save Data …. ……ENTER
Exit ……..MENU (twice)

[Video Circuit]

5. Side by Side Sub Picture Tint

Purpose: To match the sub picture color to that of the main picture.

Symptom: Main and sub pictures colors differ.

Measuring Instrument	-----
Test Point	-----
Ext. Trigger	------
Measuring Range	------
Input Signal	NTSC
Input Terminal	Video

1. Supply an NTSC signal to an External Video Input.
2. Select the NTSC signal as the source for both the main and sub pictures.
3. Activate Side by Side POP
3. Activate the Adjustment mode.
4. Select Item “1 TNTS” in the SNTS Function.
5. Adjust data to match the sub picture color to that of the main picture.
   (If “1 TNTS” range is short, adjust Items “4 VPDS” and “5 UPDS”)

CIRCUIT ADJUST MODE

Activate …….. MENU-0-1-5-7
Function ……..AUDIO
Item No. ……VIDEO
Adjust Data ……ADJUST
Save Data …. ……ENTER
Exit ……..MENU (twice)

[Video Circuit]

6. Side by Side Sub Color

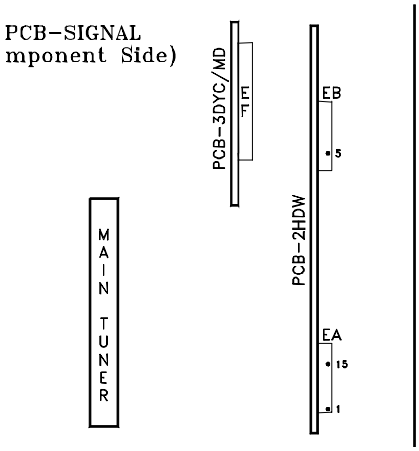
Purpose To set the sub picture color level.

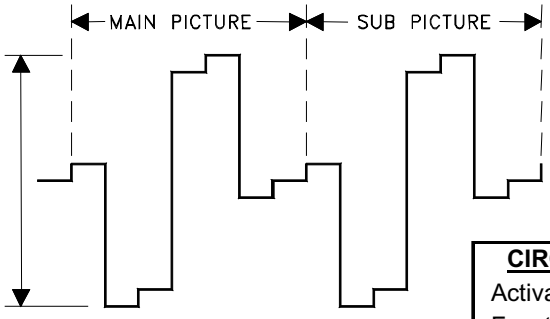
Symptom: Main and sub pictures color levels differs.

Measuring Instrument	Oscilloscope
Test Point	EB connector pin 5
Ext. Trigger	------
Measuring Range	200mV/div 20usec/div
Input Signal	Color Bars
Input Terminal	Video Input

Note: *Let the set run for at least one minute before making this adjustment.*

1. Supply a color bar signal.
2. Select the color bar signal as the source for both the main and sub picture.
3. Connect an oscilloscope to pin 5 of the EB connector.
4. Activate the Side by Side mode.
5. Activate the Service Mode
6. Select Item “2 COLS” in the SNTS function.
7. Adjust data so the amplitude of the Sub signal equals that of the main signal.





CIRCUIT ADJUST MODE

Activate …….. MENU-0-1-5-7
Function ……..AUDIO
Item No. ……VIDEO
Adjust Data ……ADJUST
Save Data …. ……ENTER
Exit ……..MENU (twice)

[CRT Circuit]

7. CRT Cutoff

Purpose: To set the cutoff point for all three CRTs.

Symptom: Monochrome has a color tint, or incorrect brightness.

Measuring Instrument	Oscilloscope
Test Point	TP6R, TP6G, TP6B
Ext. Trigger	------
Measuring Range	50V/Div. 2msec/Div.
Input Signal	None
Input Terminal	Video Input

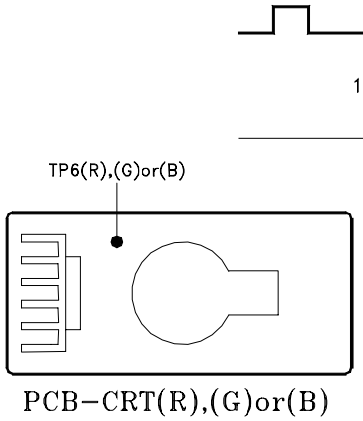
Note: ***Use the Expand mode (full screen)***

1. Select an External Input with no signal.
2. Enter the Adjustment Mode, VC Function.
3. Press "1", automatically blanks the screen and sets COL to 0.
4. Set the data to the values given in the table below.
5. Connect the oscilloscope to TP6R.
6. Adjust the Red Screen VR so the black level is 190V, as shown below, or 198.5V ±1VDC using an DC Voltmeter.
7. Repeat Steps 4 and 5 to set the Blue and Green Screen VRs, using TP6G and TP6B.

Note: *White Balance must be performed after this adjustment.*

Cutoff Preset VC Data

Item	Abbr	Data
1	SCT	42
2	SBRT	25
5	SCON	3
6	RDRH	25
7	GDR	35
8	BDRH	25
9	CRTH	20
10	CTGH	55
11	CTBH	20



CIRCUIT ADJUST MODE

Activate …….. MENU-0-1-5-7
Function …..……..AUDIO
Item No. ……..……VIDEO
Adjust Data ……..ADJUST
Save Data …. ……ENTER
Exit ……...MENU (twice)

[CRT Circuit]

8. White Balance (NTSC)

Purpose To set the CRTs white level in the NTSC mode.

Symptom: Monochrome has a color tint.

Measuring Instrument	DC Voltmeter
Test Point	------
Ext. Trigger	------
Measuring Range	------
Input Signal	NTSC White Raster
Input Terminal	RF or Video

Note: ***Use the "FORMAT" button to activate the Expand mode (full screen).***

1. Supply a full White Raster Signal
2. Activate the Service Mode, VC function.
3. Set the data for Item "23 COL" to 0.
4. Adjust Items "6 RDRH" and "8 BDRH" for optimum white at the center of the screen.
5. Reduce the input luminance level to 30%.
6. Adjust Items "9 CTRH" and "11 CTBH" for optimum white.
7. Insert a Milliammeter in series with each CRT Cathode. The maximum allowable current for each CRT is given in the table below.
8. Set the white raster to 100% and adjust Items "12 RDRL" and "13 BDRL" for optimum white at the center of the screen.
9. Reduce the luminance level to 30%.
10. Adjust Item "14 CTRL" and "16 CTBL" for optimum white.
11. Set the data for Item "23 COL" back to 31.

CIRCUIT ADJUST MODE

Activate …….. MENU-0-1-5-7
Function …..……..AUDIO
Item No. ……..……VIDEO
Adjust Data ……..ADJUST
Save Data …. ……ENTER
Exit ……...MENU (twice)

Maximum CRT Current

CRT	55"& 65" CURRENT	73" CURRENT
RED	580 uA	900 uA
GREEN	580 uA	900 uA
BLUE	580 uA	900 uA

[CRT Circuit]

9. White Balance (HD)

Purpose: To set the CRTs white level in the HD mode.

Symptom: Monchrome pictures have a color tint.

Measuring Instrument	-----
Test Point	-----
Ext. Trigger	------
Measuring Range	-----
Input Signal	HD White Raster
Input Terminal	DTV Inputs

1. Supply an HD Full White Raster signal to the DTV Inputs.
2. Select the DTV Inputs (Input button)
3. Activate the Adjustment mode, VC Function.
4. Set Item “23 COL” to 0.
5. Adjust Items “6 RDRH” and “8 BDRH” for optimum white at the center of the screen.
6. Reduce the input signal luminance to 30%.
7. Adjust Items “9 CTRH” and “11 CTBH” for optimum white.
8. Set the data for Item “23 COL” back to 31.

CIRCUIT ADJUST MODE

Activate …….. MENU-0-1-5-7
Function …..……..AUDIO
Item No. ……..……VIDEO
Adjust Data ….……ADJUST
Save Data …. ……ENTER
Exit ……...MENU (twice)

[CRT Circuit]

10. Cb, Cr Offset

Purpose To set Cb and Cr color signal level.

Symptom: Incorrect colors.

Measuring Instrument	-----
Test Point	-----
Ext. Trigger	------
Measuring Range	------
Input Signal	White Raster (HD&NTSC)
Input Terminal	Video & DTV Inputs

1. Supply an NTSC White Raster (30% luminance) signal to a Video Input.
2. Activate the Adjust Mode, VC Function
3. Set Item “23 COL” data to 63.
4. Adjust Items “60 CRO1” and “61 CBO1” for optimum white.
5. Set Item “23 COL” data to 31.
6. Save data and Exit the Service Mode.

CIRCUIT ADJUST MODE

Activate …….. MENU-0-1-5-7
Function …..……..AUDIO
Item No. ……..……VIDEO
Adjust Data ….……ADJUST
Save Data …. ……ENTER
Exit ……...MENU (twice)

[Video Circuit]

11. Black Level

Purpose: To set the black level of the picture.

Symptom: Excess or insufficient brightness.

Measuring Instrument	-----
Test Point	-----
Ext. Trigger	------
Measuring Range	------
Input Signal	Monoscope
Input Terminal	Video Input

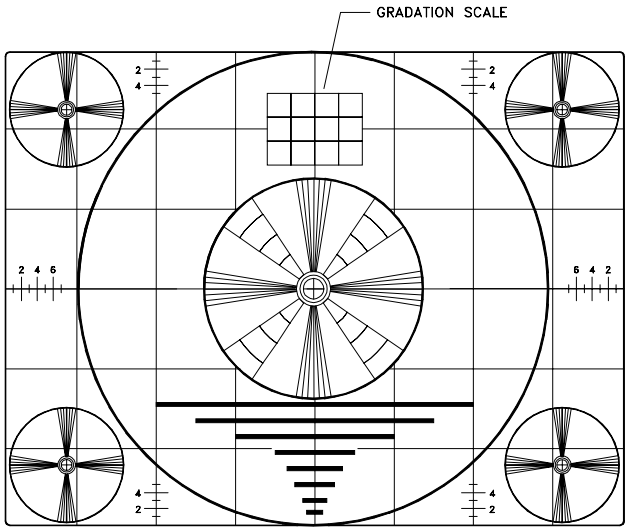
1. Supply a Monoscope signal to a Video Input.
2. Activate the Adjust Mode, VC Function.
3. Adjust Item "2 SBRT" so the 0% and 10% black levels on the gradation scale are the same.
4. Press ENTER to save data.
7. Exit the Service Mode.

CIRCUIT ADJUST MODE

Activate …….. MENU-0-1-5-7
Function ……..AUDIO
Item No. ……VIDEO
Adjust Data ……ADJUST
Save Data …. ……ENTER
Exit ……..MENU (twice)

40%	30%	20%	10%
50%	0%	0%	0%
60%	70%	80%	90%

GRADATION SCALE



[Video Circuit]

12. Sub Contrast

Purpose To set overall beam current to its' optimum level.

Symptom: Excess or insufficient contrast.

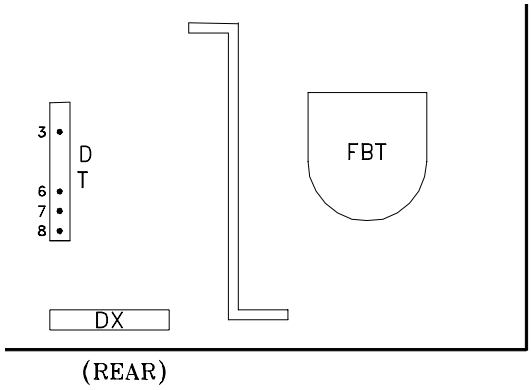
Measuring Instrument	DC ma meter
Test Point	DT connector pins 7 & 8
Ext. Trigger	------
Measuring Range	-----
Input Signal	Grayscale
Input Terminal	RF Input

Note: Activate the Expand mode (full screen).

1. Supply a Grayscale signal to a RF Input.
2. Activate the Adjust Mode, VC Function.
3. Select Item "1 SCT", signal level automatically reduces.
4. Connect a 3ma DC meter between DT connector pins 7 and 8. Positive lead to pin 7.
5. Adjust Item "1 SCT" for 615µA ±10µA (645µa ±10µa on the WS-73909).
6. Remove the meter.
7. Save data and Exit the Service Mode.

CIRCUIT ADJUST MODE

Activate …….. MENU-0-1-5-7
Function ……..AUDIO
Item No. ……VIDEO
Adjust Data ……ADJUST
Save Data …. ……ENTER
Exit ……..MENU (twice)



[Focus Circuit]

13. Dynamic Focus Preset

Purpose: To improve edge focus.

Symptom: Poor focus at the edges of the screen.

Measuring Instrument	-----
Test Point	-----
Ext. Trigger	------
Measuring Range	-----
Input Signal	Monoscope
Input Terminal	Video Input

1. Supply a Monoscope signal to a Video Input
2. Activate the Convergence Mode.
3. Select the DF Function under the Conv. Coarse Mode.
4. Set Items “0 DFH” and “1 DFV” to the data values given in the DF Table.
5. Press “6” to activate CONV-MISC
6. Set “0 FPHS” and “1 DPHS” to data values given in the CONV-MISC Table.
5. Exit the Conv. Mode.

CONVERGENCE MODE

Activate ……..MENU-0-1-5-9
Misc. ……..……"6"
Coarse……..…."5"
Fine ……..…."4"
Color (R,G or B)……AUDIO
Item No……..…..VIDEO
Adjust/Move…….ADJUST
Cursor Toggle……..ENTER
Save & Exit…..MENU (twice)

DF
(MENU-0-1-5-9-5)

Item	Abbr.	Data
0	DFH	-300
1	DFV	-100

CONV MISC
(MENU-0-1-5-9-6)

Item	Abbr.	Data
9	DPHS	0
10	DOFS	63

[Video Circuit]

14. Lens Focus

Purpose To set the Lens position for optimum focus.

Symptom: Poor focus

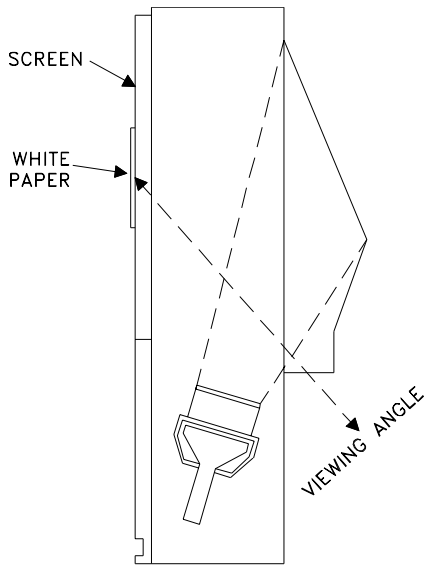
Measuring Instrument	-----
Test Point	------
Ext. Trigger	------
Measuring Range	-----
Input Signal	Monoscope
Input Terminal	Video Input

Note: *This adjustment must be done before Electrostatic Focus. Perform this adjustment for RED, GREEN, and BLUE monochrome pictures.*

1. Supply a VIDEO signal (Monoscope).
2. Cover the Red and Blue Lens (producing a green raster).
3. Adjust the Green Lens for best focus at the center of the Monoscope pattern.

Note: *Attach a white paper to the screen center. During adjustment, observe the picture on the screen from inside for easier adjustment.*

4. Repeat Steps 2 and 3 for the Red and Blue monochrome pictures.



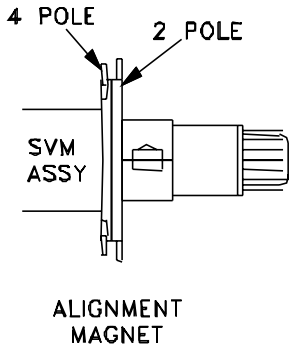
[CRT Circuit]

15. Electrostatic Focus & (Alignment Magnet)

Purpose: To set electrostatic focus to the optimum point.

Symptom: Poor focus.

Measuring Instrument	-----
Test Point	-----
Ext. Trigger	------
Measuring Range	------
Input Signal	Monscope & Crosshatch
Input Terminal	Video Input



Note: *This adjustment must be performed after the Sub Contrast adjustment.*

Alignment Magnet Adjustment (WS-55909, WS-65909 and WS-73909 Only)

This adjustment must be performed before Static Focus Adjustment

1. Supply a Crosshatch with Center Dot signal to a Video Input.
2. Select a Green raster using the table below.
3. Roughly adjust Green Focus VR.
4. Rotate Green Focus VR CCW so the center dot is about 10mm diameter.
5. Adjust the Green 4 Pole Magnet for the roundest center dot.
6. Set the Green Focus VR for optimum focus.
7. Repeat the procedure with a Red raster and adjust the Red 4 Pole Magnet.
8. Use silicon to lock the magnets in place.

Static Focus Adjustment (All Models)

1. Supply a Monoscope signal to a Video Input
2. Activate A/V Reset
3. Select Red, Green or Blue rasters using the table below.
3. Set the Red, Green and Blue Focus VRs for optimum focus at the top center of the picture..

Raster Color Selection

Color Raster	Activation Code
Red	MENU-0-1-5-9-1
Green	MENU-0-1-5-9-2
Blue	MENU-0-1-5-9-3

[On Screen Display]

16.Character Position

Purpose To position the character display horizontally.

Symptom: Incorrect display position

Measuring Instrument	-----
Test Point	-----
Ext. Trigger	------
Measuring Range	------
Input Signal	Video Signal (HD/NTSC)
Input Terminal	ANT-A/DTV

1. Supply an NTSC signal to Ant-A and select Ant-A as the source.
2. Enter the OSD Position Mode, press “MENU-0-1-8-8”.
3. Adjust “OSDSD” to center the OSD horizontally.
4. Press “MENU” to save data and exit the mode.
5. Supply a HD signal to the DTV inputs and select the DTV Inputs as the source.
6. Enter the OSD Position Mode, press “MENU-0-1-8-8”.
7. Adjust “OSDHD” to center the OSD horizontally.
3. Press “MENU” to save data and exit the mode.

[Conv/Defl]

17. Geometry Preset

Purpose: To preset data controlling raster geometry

Symptom: Raster distortion.

Measuring Instrument	-----
Test Point	------
Ext. Trigger	------
Measuring Range	-----
Input Signal	NTSC & HD
Input Terminal	Video & DTV Inputs

Note: *This procedure is usually only necessary if an E2PROM is replaced in the TV Control, DM or Convergence circuits.*

Procedure

In the Circuit Adjustment and Coarse Convergence Modes pre-set the data to the values given in the Tables below.

CIRCUIT ADJUST MODE

Activate …….. MENU-0-1-5-7
Function ……..AUDIO
Item No. ……VIDEO
Adjust Data ……ADJUST
Save Data …. ……ENTER
Exit ……..MENU (twice)

CONVERGENCE MODE

Activate ……..MENU-0-1-5-9
Misc. ……"6"
Coarse……"5"
Fine ……."4"
Color (R,G or B)……AUDIO
Item No……VIDEO
Adjust/Move……ADJUST
Cursor Toggle……..ENTER
Save & Exit…..MENU (twice)

DEFL JUNGLE (MENU-0-1-5-7)

Item #	Abbrev.	55"&65" Data		73" Data	
		NTSC	HD	NTSC	HD
1	HWID	33	33	33	36
2	HKEY	31	31	31	31
3	EWPT	22	22	16	22
5	EWPB	31	27	21	27
7	VHGT	27	25	32	32
8	VLIN	9	13	9	9
9	VSCN	0	0	0	0
20	VPOS	31	31	31	31

CONV GREEN (MENU-0-1-5-9-5)

Item #	Abbrev.	55" Data		65" Data		73" Data	
		SD	HD	SD	HD	SD	HD
0	HSTA	0	0	0	0	0	0
1	VSTA	0	0	0	0	0	0
2	SKEW	0	0	0	0	0	0
3	TILT	0	0	0	0	0	0
4	HWID	0	0	0	0	0	0
5	HLIN	0	0	0	0	0	0
6	SPCC	0	0	0	0	0	0
7	HKEY	0	0	0	0	0	0
8	TBPC	-200	-170	-200	-170	-200	-170
9	VKEY	0	0	0	0	0	0
10	VWID	0	0	0	0	0	0
11	VLIN	0	0	0	0	0	0

CONV BLUE (MENU-0-1-5-9)

Item #	Abbrev.	55" Data		65" Data		73" Data	
		SD	HD	SD	HD	SD	HD
0	HSTA	-50	-50	-50	-50	-50	-50
1	VSTA	0	0	0	0	0	0
2	SKEW	0	0	0	0	0	0
3	TILT	0	0	0	0	0	0
4	HLIN	160	150	160	150	220	150
5	HWID	-20	-20	-20	-20	-20	-20
6	VKEY	70	70	70	70	80	70
7	VWID	0	0	0	0	0	0
8	VLIN	0	0	0	0	0	0
9	TBPC	-20	-20	-20	-20	-20	-20
10	HSBW	-30	-30	-30	-30	-30	-30

CONV RED (MENU-0-1-5-9-5)

Item #	Abbrev.	55" Data		65" Data		73" Data	
		SD	HD	SD	HD	SD	HD
0	HSTA	50	50	50	50	50	50
1	VSTA	0	0	0	0	0	0
2	SKEW	0	0	0	0	0	0
3	TILT	0	0	0	0	0	0
4	HLIN	-150	-150	-150	-150	-200	-150
5	HWID	10	10	10	10	10	10
6	VKEY	-90	-90	-90	-90	-90	-90
7	VWID	0	0	0	0	0	0
8	VLIN	0	0	0	0	0	0
9	TBPC	20	20	20	20	20	20
10	HSBW	30	30	30	30	30	30

[Deflection Circuit]

18: Deflection Geometry Height & Width Adjustment

Purpose: To set the height, width and linearity of the raster.

Symptom: Incorrect height, width and/or linearity.

Measuring Instrument	-----
Test Point	-----
Ext. Trigger	------
Measuring Range	-----
Input Signal	Monoscope (NTSC & HD)
Input Terminal	Video & DTV Inputs

CIRCUIT ADJUST MODE

Activate …….. MENU-0-1-5-7
Function ……..……..AUDIO
Item No. ……..……VIDEO
Adjust Data ……..……ADJUST
Save Data …. ……ENTER
Exit ……..MENU (twice)

Preliminary:

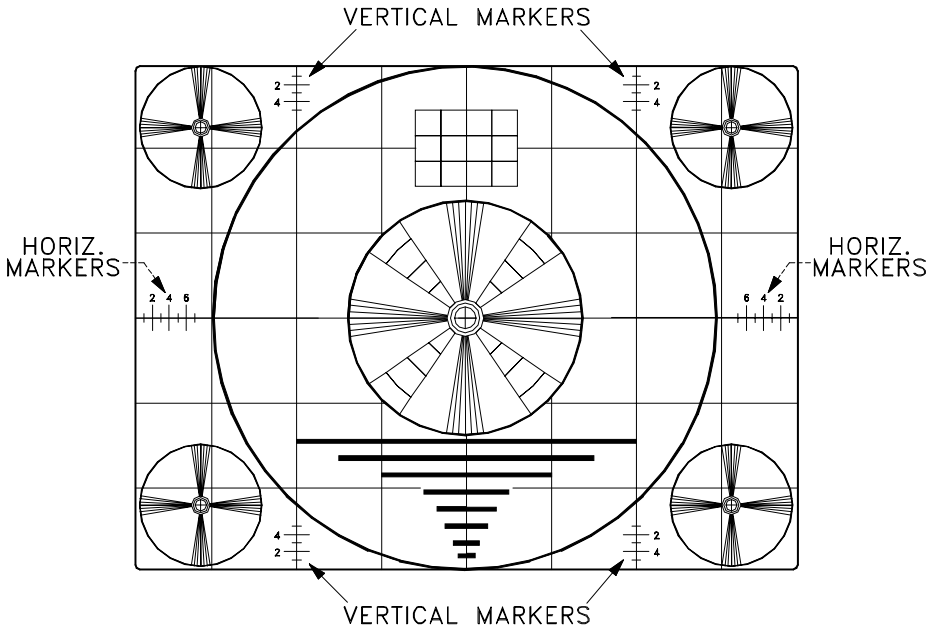
1. DO NOT change the initial values for "#8 VLIN" in the Defl. Jungle Function.
2. DO NOT exceed the following VHGT adjustment ranges:
   NTSC ... from -4 to +10
   HD ... from -10 TO +5

NTSC Mode

1. Supply an NTSC Monoscope signal to a Video Input.
2. Select the Monoscope as the signal source.
3. Activate the Adjustment Mode, JNGL Function.
4. Select and adjust each of the following items.
   - "7 VHGT" ... so the vertical marker sum = 4
   - "1 HWD" ... so the horizontal marker sum = 7
5. Save data and Exit the Service Mode.

HD Mode

1. Supply an HD Monoscope signal to the DTV HD Inputs.
2. Select the DTV Inputs as the signal source (Input button)
3. Activate the Service Mode, Defl. Jungle Function.
4. Select and adjust each of the following items.
   - "7 VHGT" ... so the vertical marker sum = 2
   - "1 HWD" ... so the horizontal marker sum = 5
5. Save data and Exit the Service Mode.



[Convergence Circuit]

19. Convergence Geometry Adjustment

Purpose: To set the Convergence circuit geometry adjustments.

Symptom: Raster distortion at the top, bottom or sides of the picture.

Measuring Instrument	-----
Test Point	------
Ext. Trigger	------
Measuring Range	-----
Input Signal	NTSC -- None HD -- HD sync
Input Terminal	Video & DTV Inputs

Note: *Deflection Circuit Geometry must be performed before this adjustment.*

NTSC mode

1. Select a Video Input with no signal.
2. Activate the Convergence Mode, Coarse Green.
3. Adjust the Coarse Green Items shown below for straight crosshatch lines.
4. Select the Fine Green Mode, a Cursor is displayed on the crosshatch.
5. Use the Cursor to adjust for straight crosshatch lines.
6. Exit the Convergence Mode.

HD mode

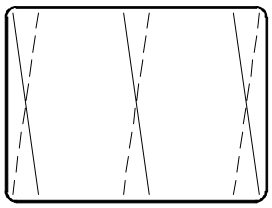
1. Supply horizontal and vertical HD sync to the DTV Inputs and select the DTV Inputs as the source.
   Note: I*f an HD signal is not available, select Ant-DTV, with no signal, as the source.*
2. Enter the Convergence Mode, Coarse Green.
3. Repeat NTSC Steps 3 through 6 in the HD mode.

CONVERGENCE MODE

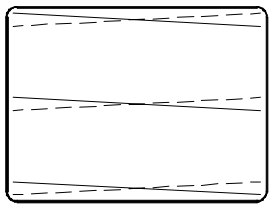
Activate ……..MENU-0-1-5-9
Misc. ……."6"
Coarse……."5"
Fine ……."4"
Color (R,G or B)……AUDIO
Item No……..VIDEO
Adjust/Move…….ADJUST
Cursor Toggle……..ENTER
Save & Exit…..MENU (twice)

COARSE GREEN ADJUSTMENTS

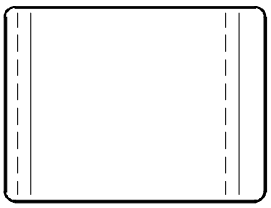
2 SKEW



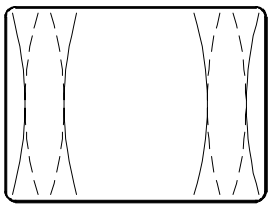
3 TILT



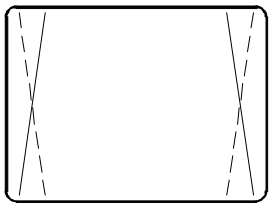
5 HLIN



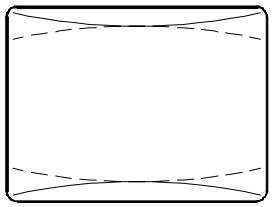
6 SPCC



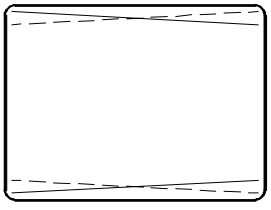
7 HKEY



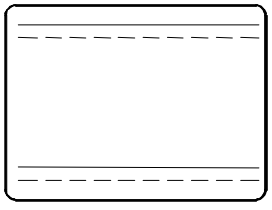
8 TBPC



9 VKEY



11 VLIN



[Convergence Circuit]

20. Centering and Static Convergence

Purpose: To converge red, green and blue at the center of the screen

Symptom: Color edging over the entire picture.

Measuring Instrument	-----
Test Point	-----
Ext. Trigger	------
Measuring Range	-----
Input Signal	NTSC -- Monoscope HD -- Monoscope
Input Terminal	Video & DTV Inputs

CONVERGENCE MODE

Activate ……..MENU-0-1-5-9
Misc. ……"6"
Coarse……..…."5"
Fine ……..."4"
Color (R,G or B)……AUDIO
Item No……..VIDEO
Adjust/Move…….ADJUST
Cursor Toggle……..ENTER
Save & Exit…..MENU (twice)

Preliminary

Degauss the shield cover and bracket unit of the CRT assembly and chassis.
DO NOT degauss the CPM Assemblies.

HD mode

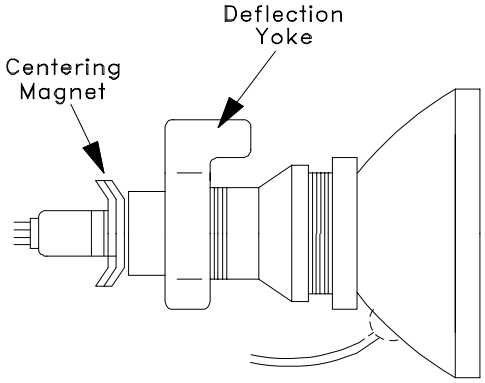
1. Supply an HD Monoscope signal to the DTV Inputs.
2. Select the DTV Inputs as the signal source (Input button).
3. Enter the Convergence Coarse mode.
4. Set the data for the "HSTA" and "VSTA" items to:

GREEN	RED	BLUE
HSTS = 0	HSTA = 50	HSTA = -50
VSTA = 0	VSTA = 0	VSTA = 0

5. In the Coarse Green mode:
   - Center the Green Raster using the Green Centering Magnet.
   - Rotate the Green Deflection Yoke to correct any tilt.
6. In the Coarse Red mode, use the Red Centering Magnet to converge red on the green at the center of screen. Correct any red tilt with the Red Deflection Yoke.
7. In the Coarse Blue mode, repeat Step 6 using the Blue Centering magnet and the Blue Deflection Yoke.
8. Exit the Convergence mode.

SD mode

1. Supply an NTSC Monoscope signal to a Video Input.
2. Select the Monoscope as the signal source (Input button).
3. Enter the Convergence Coarse Green mode.
4. Confirm that the Green Raster is centered.



[Convergence Circuit]

21. Coarse Convergence

Purpose: To converge red and blue on green at the edges of the screen.

Symptom: Color edging at the top, bottom and sides of the screen.

Measuring Instrument	-----
Test Point	------
Ext. Trigger	------
Measuring Range	-----
Input Signal	NTSC -- None HD -- HD sync
Input Terminal	Video & HD Inputs

SD mode

1. Select an External Input with no signal.
2. Activate the Convergence Mode, Coarse Red.
3. Adjust the Items shown below to converge the red on the green.
4. Select Coarse Blue mode.
5. Adjust the Items shown below to converge the blue on the green.
   Note: *If center convergence shifts, use red and blue Items "0 HSTA" and "1 VSTA" to correct the shift.*
6. Exit the Convergence Mode.

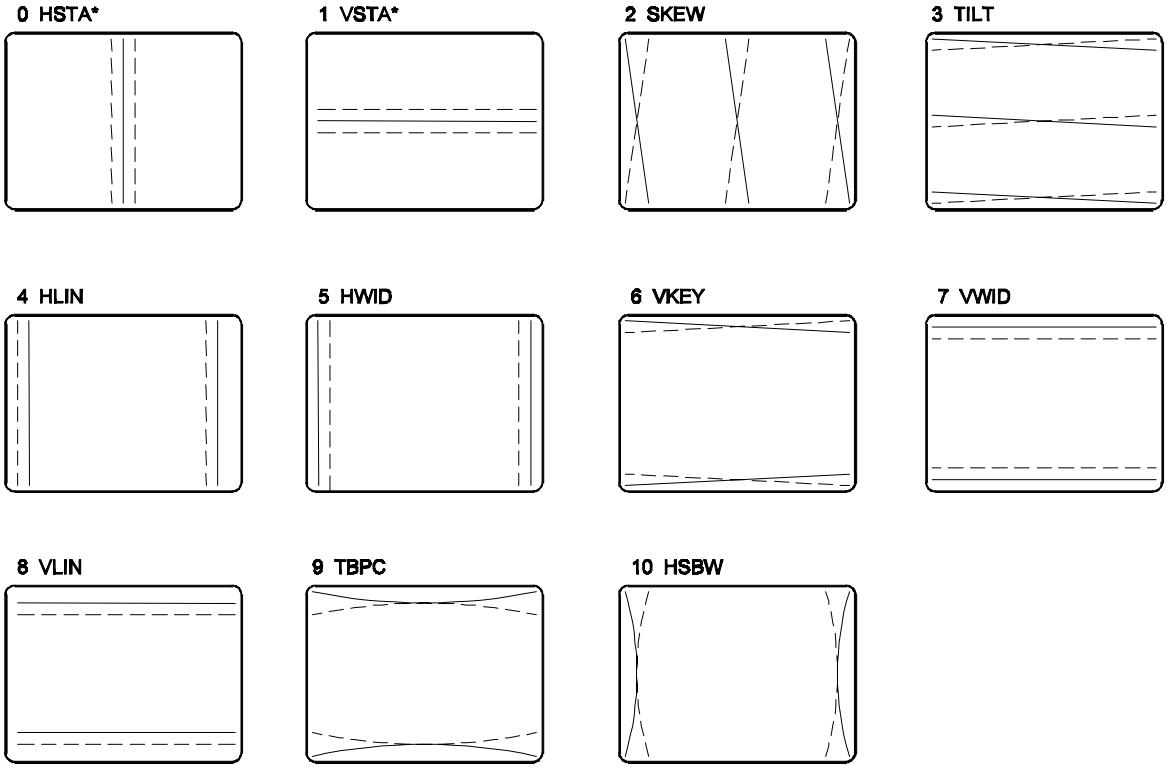
HD mode

1. Supply horizontal and vertical HD sync to the DTV Inputs and select the DTV Inputs as the source.
   Note: I*f an HD signal is not available, select Ant-DTV, with no signal, as the source.*
2. Repeat SD Steps 2 through 5 in the HD mode.
3. Exit the Convergence mode.

CONVERGENCE MODE

Activate ……..MENU-0-1-5-9
Misc. ……."6"
Coarse……..…."5"
Fine ……..."4"
Color (R,G or B)……AUDIO
Item No……..VIDEO
Adjust/Move…….ADJUST
Cursor Toggle……..ENTER
Save & Exit…..MENU (twice)

COARSE CONVERGENC RED & BLUE ADJUSTMENTS



* Data should not exceed ±100

[Convergence Circuit]

22. Fine Convergence

Purpose: To converge red, green and blue at the edges of the screen

Symptom: Color edging at the edges of the picture.

Measuring Instrument	-----
Test Point	-----
Ext. Trigger	------
Measuring Range	-----
Input Signal	NTSC -- None HD -- HD sync
Input Terminal	Video & DTV Inputs

CONVERGENCE MODE

Activate ……..MENU-0-1-5-9
Misc. ……"6"
Coarse……..…."5"
Fine ……..."4"
Color (R,G or B)……AUDIO
Item No……..…..VIDEO
Adjust/Move…….ADJUST
Cursor Toggle……..ENTER
Save & Exit…..MENU (twice)

SD Fine Adjustment

1. Select an External Input, no signal.
2. Activate the Convergence Mode, Fine Red.
3. Use the Cursor to converge red on the green.
4. Select the Fine Blue mode.
5. Use the Cursor to converge blue on the green.
6. Exit the Convergence mode.

HD Fine Adjustment

1. Supply an HD signal (sync only) to the DTV inputs and select DTV with the "Audio" button.
   Note: I*f an HD signal is not available, select Ant-DTV, with no signal, as the source.*
2. Repeat SD Fine Adjustment Steps 2 through 6, in the HD mode.

CHIP PARTS REPLACEMENT

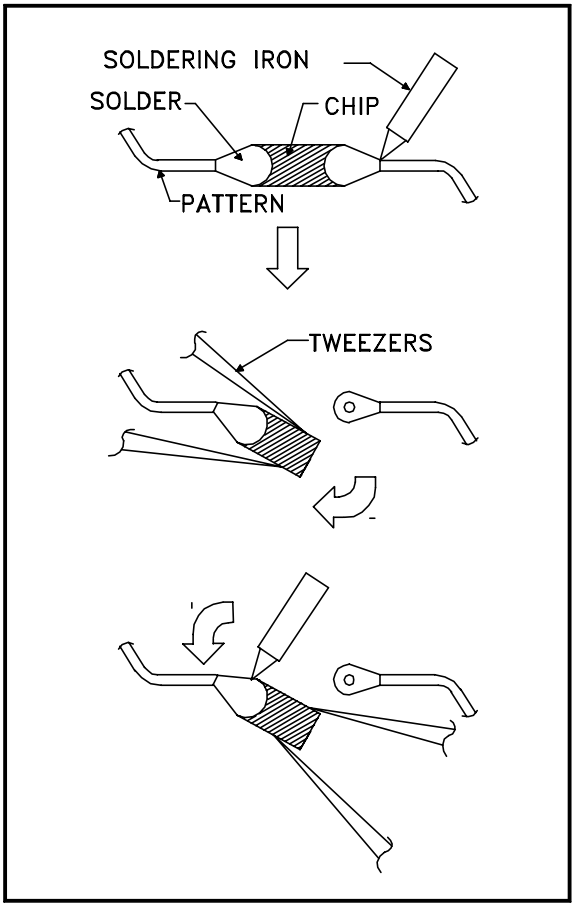
Some resistors, shorting jumpers (0 Ohm resistors), ceramic capacitors, transistors and diodes are chip parts. The following precautions should be taken when replacing these parts.

Cautions:

1. Use a fine tipped, well insulated soldering iron (approximately 30 watts), and tweezers.
2. Melt the solder and remove the chip parts carefully so as not to tear the copper foil from the printed circuit board.
3. Discard removed chips; do not reuse them.
4. Do not apply heat for more than 3 (three) seconds to new chip parts.
5. Avoid using a rubbing stroke when soldering.
6. Take care not to scratch, or damage the chip parts when soldering.
7. Supplementary cementing is not required.

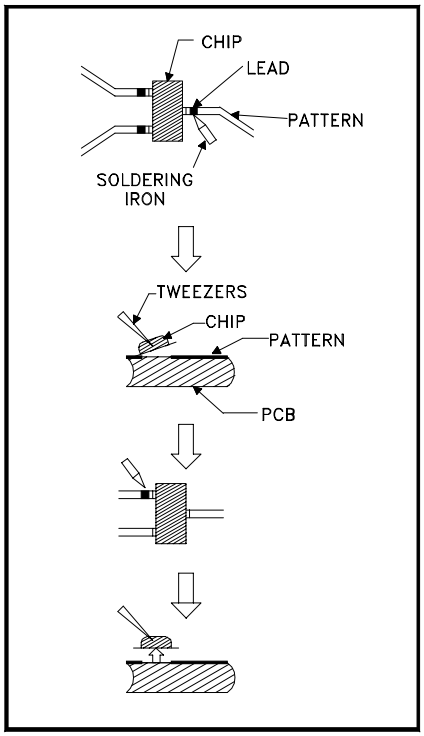
Chip Parts Removal (Resistors, Capacitors, etc.)

1. Grasp the part with tweezers. Melt the solder at both sides alternately, and remove one side of the part with a twisting motion.
2. Melt the solder at the other side and remove the part.



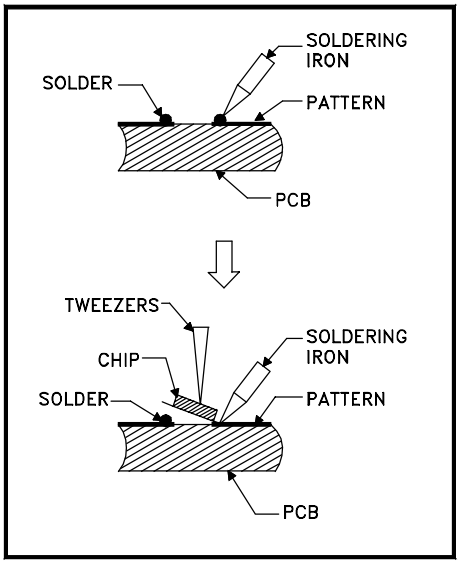
Chip Parts Removal (Transistors)

1. Melt the solder of one lead and lift the side of that lead upward.
2. Simultaneously melt the solder of the other two leads and lift the part from the PCB.



Replacement

1. Presolder the contact points on the circuit pattern.
2. Press the part downward with tweezers and apply the soldering iron as shown.



REPLACEMENT PARTS

Parts Ordering
To expedite delivery of replacement parts orders, specify the following:

1. Model Number/Serial Number
2. Part Number and description
3. Quantity

Note: Unless complete information is supplied, delay in processing of orders will result.

Critical and Warranty Parts Designation

Critical Electrical Components are indicated by **Bold Type** in the Parts List, and in the schematic diagrams by shading.

Warranty Return Parts are indicated in the Parts List with an **(*)**.

Parts Tolerance Codes
Refer to the following chart for tolerance characteristics of electrical components.

MARK	B	C	D	F	G	J	K
Tolerance %	± 0.1	± 0.25	± 0.5	± 1	± 2	± 5	± 10

MARK	M	N	V	X	Z	P	Q
Tolerance %	± 20	± 30	± 10	+ 40 -20	+ 80 -20	+ 100 - 0	+ 30 -10

MARK	M	N	V	X	Z
Tolerance (pF)	± 0.1	± 0.25	± 0.5	± 1	± 2

QUICK REFERENCE FOR COMMON REPLACEMENT PARTS

CRT ASSEMBLIES

MODEL	ASSY-CRT-RED	ASSY-CRT-GREEN	ASSY-CRT-BLUE
WS-55859	251C213040	251C213050	251C213060
WS-55909	251C214010	251C214020	251C214030
WS-65869	251C213070	251C213080	251C213090
WS-65909	251C214040	251C214050	251C214060
WS-73909	251C214070	251C214080	251C214090

REMOTE CONTROL

	290P106010	REMOTE CONTROL

HIGH VOLTAGE / DEFLECTION COMPONENTS

Q5A31	261P071010	HORIZ-OUT 2SC5418 RL	
Q5A51	**261P082010**	**HV-OUT 2SK2771-O1R**	
T5A51	**334P278010**	**TRANS-FLYBACK**	
	920P016010	**HV-BLOCK**	
	129P059050	VR-FOCUS	
	338P046030	SVM COIL - G&B	All
	338P051010	SVM COIL - GREEN	WS-55909 / WS-65869 / WS-65909 / WS-73909
	330P276010	**DEFL-YOKE**	
	453B035010	**CAP-ANODE-SHORT-RED**	**WS-55859 / WS-55909 / WS-65869 / WS-65909**
	453B035020	**CAP ANODE-LONG-G&B**	**WS-55859 / WS-55909 / WS-65869 / WS-65909**
	453B035030	**CAP-ANODE-SHORT-RED**	**WS-73909**
	453B035040	**CAP ANODE-LONG-G&B**	**WS-73909**

MISCELLANEOUS

MODEL	MIRROR	LENTICULAR SCREEN	FRESNEL LENS
WS-55859	767D055040	491P103010	491P104010
WS-55909	767D055040	491P103010	491P104010
WS-65869	767D048090	491P105010	491P106010
WS-65909	767D048090	491P105010	491P106010
WS-73909	767C031010	491P085020	491P086020

[#] Model Legend: (1) WS-55859, (2) WS-55909, (3) WS-65869, (4) WS-65909, (5) WS-73909

Ref #	Part #	Part Name & Description	[#]
		TUBES	
251C213040		**ASSY-CRT-RED**	**1**
251C213050		**ASSY-CRT-GREEN**	**1**
251C213060		**ASSY-CRT-BLUE**	**1**
251C213070		**ASSY-CRT-RED**	**3**
251C213080		**ASSY-CRT-GREEN**	**3**
251C213090		**ASSY-CRT-BLUE**	**3**
251C214010		**ASSY-CRT-RED**	**2**
251C214020		**ASSY-CRT-GREEN**	**2**
251C214030		**ASSY-CRT-BLUE**	**2**
251C214040		**ASSY-CRT-RED**	**4**
251C214050		**ASSY-CRT-GREEN**	**4**
251C214060		**ASSY-CRT-BLUE**	**4**
251C214070		**ASSY-CRT-RED**	**5**
251C214080		**ASSY-CRT-GREEN**	**5**
251C214090		**ASSY-CRT-BLUE**	**5**
		INTEGRATED CIRCUITS	
IC2A00	270P870010	IC - CXA2151Q	
IC2A60	272P938010	IC - M52055FP	
IC2B00	270P870010	IC - CXA2151Q	
IC2C00	275P496010	IC-C-MOS - UPD64082GF-3BA	
IC2C01	275P531010	IC-C-MOS - MSM54V16258B-45TS-K	
IC2D01	272P379020	IC - LM1881MX (NSC)	
IC2E00	270P658030	IC - CXA2019AQ/T4	
IC2F50	272P379020	IC - LM1881MX (NSC)	
IC2F60	272P379020	IC - LM1881MX (NSC)	
IC2F70	275P718010	IC-C-MOS - TC74HC4053FT	
IC2F80	275P718010	IC-C-MOS - TC74HC4053FT	
IC2H00	270P658030	IC - CXA2019AQ/T4	
IC2K00	270P623010	IC - CXA2069Q	
IC2L00	270P623010	IC - CXA2069Q	
IC2V00	270P663020	IC - CXA2101AQ	
IC2V90	275P419010	IC-C-MOS - SN74AHCT1G126DBV	
IC2Y01	270P526020	IC - MM1111XF	
IC3A01	270P467010	IC - TDA9855	
IC3E01	**270P750010**	**IC - LA4663**	
IC4A01	270P664010	IC - CXA2102Q	
IC4A02	270P575030	IC - NJM78M09DLA-TE1	
IC4A03	263P384010	IC-C-MOS - TC74HC221AF-EL	
IC4B01	270P261020	IC - TDA8177	
IC5A00	**267P143020**	**KIC - MSPAD101**	
IC5A01	**272P237010**	**IC - LA6324N**	
IC5A02	**266P154010**	**IC - UPC393C**	
IC5A03	**270P704010**	**IC - LM4040BIZ-10.0**	
IC5A05	270P816010	IC - NJM431L	
IC5F00	263P479010	IC-C-MOS - TC74HC123AF	
IC6B01	**270P667010**	**IC - TDA6120Q**	
IC6G01	**270P667010**	**IC - TDA6120Q**	
IC6R01	**270P667010**	**IC - TDA6120Q**	
IC7A00	275P770010	IC-C-MOS, MICROCOMPU - M306V0ME-110FP	
IC7A01	275P533010	IC-C-MOS - M24C64WM6T	
IC7A02	270P706010	IC - MAX823	
IC7A03	270P873010	IC - SN74CBT1G125DBVR	
IC7A04	270P873010	IC - SN74CBT1G125DBVR	
IC7B00	274P901010	IC-C-MOS - TC74HCT7007AF-EL	
IC7B80	263P154010	IC-C-MOS - SN74HC132DB	
IC7C30	275P419010	IC-C-MOS - SN74AHCT1G126DBV	
IC7D00	275P451010	IC-C-MOS - TC74HC4066AFN-ELP	
IC7D01	275P560010	IC - ADS931E A2D CONVERTER	
IC7D02	275P560010	IC - ADS931E A2D CONVERTER	
IC7D03	275P560010	IC - ADS931E A2D CONVERTER	
IC7D10	275P535010	IC-C-MOS - TC74AC157FN-ELP	
IC7D11	275P535010	IC-C-MOS - TC74AC157FN-ELP	
IC7E00	275P451010	IC-C-MOS - TC74HC4066AFN-ELP	
IC7E01	275P560010	IC - ADS931E A2D CONVERTER	
IC7E02	275P560010	IC - ADS931E A2D CONVERTER	
IC7E03	275P560010	IC - ADS931E A2D CONVERTER	
IC7E10	275P535010	IC-C-MOS - TC74AC157FN-ELP	
IC7E11	275P535010	IC-C-MOS - TC74AC157FN-ELP	
IC7G01	275P247010	IC-C-MOS - MB40C958VPFV	
IC7G04	275P534010	IC-C-MOS - TC74HCT574AFW-ELP	
IC7G05	275P534010	IC-C-MOS - TC74HCT574AFW-ELP	
IC7H00	275P716010	IC-C-MOS - uPD4516161AG5-A10-9NF	
IC7H01	275P716010	IC-C-MOS - uPD4516161AG5-A10-9NF	
IC7H02	275P436030	IC-C-MOS - TMC57127PPM	
IC7H03	275P439030	IC-C-MOS - MSM534031E-*TS-K	
IC7H04	270P506010	IC - M51957BFP	
IC7H05	263P384010	IC-C-MOS - TC74HC221AF-EL	
IC7H06	270P348010	IC - TLC2932IPW	
IC7H07	275P437020	IC - SLA4028	
IC7H08	270P348010	IC - TLC2932IPW	
IC7H09	274P901010	IC-C-MOS - TC74HCT7007AF-EL	
IC7H11	275P535010	IC-C-MOS - TC74AC157FN-ELP	
IC7H12	275P535010	IC-C-MOS - TC74AC157FN-ELP	
IC7H13	275P535010	IC-C-MOS - TC74AC157FN-ELP	
IC7H14	275P535010	IC-C-MOS - TC74AC157FN-ELP	
IC7K21	270P831010	IC-C-MOS - OPA2350PA	
IC7V01	275P362010	IC-C-MOS - Z86130	
IC800	275P595010	IC-C-MOS - CM0022AF	
IC801	275P615010	IC-C-MOS - AT24C32N-10SI	
IC802	270P751010	IC - TL084CD	
IC803	270P751010	IC - TL084CD	
IC804	270P751010	IC - TL084CD	
IC8C01	**267P155010**	**HIC - STK393-110**	
IC8E01	270P817010	IC - L4931CDT33-TR	
IC8E02	272P603010	IC - LM78L05ACZ/NJM78L05A	
IC8E03	275P721010	IC-C-MOS - CD0031AM	
IC9A20	**267P159010**	**HIC - STR-G6623**	
IC9A21	**270P816010**	**IC - NJM431L**	
IC9A22	267P076030	HIC - SI-3050C	
IC9A50	**267P140020**	**HIC - STR-F6628**	
IC9A51	**267P062050**	**HIC - SE110N**	
IC9C00	270P472060	IC - NJM7805FA	
IC9C01	270P210010	IC - NJM7809FA/AN7809F	
IC9C02	270P210010	IC - NJM7809FA/AN7809F	
IC9C03	270P575030	IC - NJM78M09DLA-TE1	
IC9C20	267P131010	HIC - SI-3033C	
IC9C40	267P076030	HIC - SI-3050C	
IC9C50	270P817010	IC - L4931CDT33-TR	

TRANSISTORS

TR-CHIP Type (Listed by Generic Number)

Type	Part No.	Description
PNP	260P817010	2SA1037K-Q
PNP	260P817020	2SA1037K-R
PNP	260P817030	2SA1037K-S

[#] Model Legend: (1) WS-55859, (2) WS-55909, (3) WS-65869, (4) WS-65909, (5) WS-73909

Ref #	Part #	Part Name & Description	[#]

Type	Part #	Description
NPN	260P818010	2SC2412K-Q
NPN	260P818030	2SC2412K-S
NPN	260P835030	2SC2413K-Q
PNP	261P801010	2SA1252-5,6

Conventional Transistors (By Ref #)

Ref #	Part No.	Description
Q4B01	260P559030	TR - 2SC1740S-S
Q5A01	260P788010	TR - 2SC4690-O
Q5A02	260P561020	TR - 2SA1371-E
Q5A03	260P386010	TR - 2SC2230-GR
Q5A04	260P559030	TR - 2SC1740S-S
Q5A05	260P560040	TR - 2SA933S-S
Q5A06	**260P560040**	**TR - 2SA933S-S**
Q5A07	261P123010	TRANSISTOR - UNR4113-S
Q5A08	260P325030	TR - 2SC2655-Y
Q5A10	260P603010	TR - DTA124ES/UN4112
Q5A31	261P071010	TR - 2SC5418 RL
Q5A32	260P587040	TR - 2SC2333-M,L
Q5A33	260P559030	TR - 2SC1740S-S
Q5A34	260P561020	TR - 2SA1371-E
Q5A35	260P386010	TR - 2SC2230-GR
Q5A36	260P630010	TR - 2SD2012
Q5A37	260P559030	TR - 2SC1740S-S
Q5A38	260P559030	TR - 2SC1740S-S
Q5A51	**261P082010**	**TR - 2SK2771-01R**
Q5H05	260P559050	TR - 2SC1740S-E
Q5H06	260P560040	TR - 2SA933S-S
Q5H08	260P559050	TR - 2SC1740S-E
Q5H09	260P559050	TR - 2SC1740S-E
Q5H10	260P560040	TR - 2SA933S-S
Q5H11	260P573020	TR - 2SB940A-P
Q5H12	260P574020	TR - 2SD1264A-P
Q5K00	260P664030	TR - 2SC4636
Q5K01	260P664030	TR - 2SC4636
Q5K02	260P559050	TR - 2SC1740S-E
Q5K03	260P560040	TR - 2SA933S-S
Q6B01	260P560040	TR - 2SA933S-S
Q6B02	260P560040	TR - 2SA933S-S
Q6G01	260P560040	TR - 2SA933S-S
Q6R01	260P560040	TR - 2SA933S-S
Q7C31	261P114010	TR - 2SA1585STPR
Q7K21	260P559030	TR - 2SC1740S-S
Q9A20	**261P101010**	**TR - PHP21N06T**
Q9A21	260P559030	TR - 2SC1740S-S
Q9A22	260P559030	TR - 2SC1740S-S
Q9A50	260P416030	TR - 2SC2274-F,K-F
Q9A51	260P559030	TR - 2SC1740S-S
Q9A53	260P559030	TR - 2SC1740S-S
Q9A54	260P559030	TR - 2SC1740S-S
Q9B00	261P118010	TR - ITF86130SK8T
Q9B01	261P118010	TR - ITF86130SK8T
Q9B02	261P117010	TR - HUF76112SK8

Diodes

D2J04	264P485060	DIODE - RD7.5FB2
D2J05	264P485060	DIODE - RD7.5FB2
D2J91	264P485060	DIODE - RD7.5FB2
D2M22	264P822010	D-CHIP - HSM2838
D2V44	264P828010	D-CHIP - DAN202U/MA142WK
D2W01	264P828010	D-CHIP - DAN202U/MA142WK
D2W02	264P828010	D-CHIP - DAN202U/MA142WK
D2W04	264P828010	D-CHIP - DAN202U/MA142WK
D2W05	264P828010	D-CHIP - DAN202U/MA142WK
D2W06	264P828010	D-CHIP - DAN202U/MA142WK
D4B01	264D056020	DIODE - S5500D/EM1Z/ERB12-02RK
D4B04	264P045040	DIODE - 1S24710M
D54K0	264P808010	DIODE-CHIP - DAN202K
D5A01	264P045040	DIODE - 1S24710M
D5A02	264D056020	DIODE - S5500D/EM1Z/ERB12-02RK
D5A12	264P045040	DIODE - 1S24710M
D5A13	264P483070	DIODE - RD5.1FB1
D5A14	264P045040	DIODE - 1S24710M
D5A31	262P032010	DIODE - FMV-G2GS
D5A34	264P483070	DIODE - RD5.1FB1
D5A35	264P045040	DIODE - 1S24710M
D5A36	264P045040	DIODE - 1S24710M
D5A37	264P521040	DIODE - EU1A
D5A51	262P039010	DIODE - BYW96E/20
D5A52	264P899010	DIODE - BYV26E
D5A53	264P489010	DIODE - RD16FB1
D5A54	264P724010	DIODE - STF14
D5A55	264P724010	DIODE - STF14
D5A56	264P045040	DIODE - 1S24710M
D5A57	264P521040	DIODE - EU1A
D5A58	264P045040	DIODE - 1S24710M
D5A59	264P045040	DIODE - 1S24710M
D5A60	264P489010	DIODE - RD16FB1
D5F00	264P828010	D-CHIP - DAN202U/MA142WK
D5F01	264P828010	D-CHIP - DAN202U/MA142WK
D5F02	264P828010	D-CHIP - DAN202U/MA142WK
D5H01	264P045040	DIODE - 1S24710M
D5H02	264P045040	DIODE - 1S24710M
D5H03	264P045040	DIODE - 1S24710M
D5H04	264P045040	DIODE - 1S24710M
D5K01	264P528030	DIODE - RP1H
D5K02	264P543010	DIODE - EG01
D5K03	264P543010	DIODE - EG01
D5K10	264P528030	DIODE - RP1H
D5K11	264P528030	DIODE - RP1H
D6G02	264P501090	DIODE - HZ4CLL
D6G03	264P457080	DIODE - RD3.3EB1
D7H01	264P828010	D-CHIP - DAN202U/MA142WK
D7K21	268P100010	PHOTO DIODE - SFH235FA
D7K22	264P045040	DIODE - 1S24710M
D7L20	264P485060	DIODE - RD7.5FB2
D7L21	264P212020	D-LED - LN31GPH
D8C01	264P045040	DIODE - 1S24710M
D8C02	264P045040	DIODE - 1S24710M
D8G00	264P486060	DIODE - RD9.1FB3
D8G01	264P486060	DIODE - RD9.1FB3
D9A01	262P031010	DIODE - D6SB80
D9A20	264P358040	DIODE - RU 4A
D9A21	264P899010	DIODE - BYV26E
D9A22	264P045040	DIODE - 1S24710M
D9A23	264P045040	DIODE - 1S24710M
D9A24	264P045040	DIODE - 1S24710M

[#] Model Legend: (1) WS-55859, (2) WS-55909, (3) WS-65869, (4) WS-65909, (5) WS-73909

Ref #	Part #	Part Name & Description	[#]
D9A25	264P045040	DIODE - 1S24710M	
D9A26	264P045040	DIODE - 1S24710M	
D9A27	264P045040	DIODE - 1S24710M	
D9A28	264P045040	DIODE - 1S24710M	
D9A29	264P483070	DIODE - RD5.1FB1	
D9A31	264P045040	DIODE - 1S24710M	
D9A32	264P045040	DIODE - 1S24710M	
D9A33	264P628010	DIODE - FMB-G14L	
D9A34	264P470080	DIODE - EQA02-32C/RD33EB4	
D9A35	264P469090	DIODE - EQA02-28C/RD30EB2	
D9A50	264P045040	DIODE - 1S24710M	
D9A52	264P045040	DIODE - 1S24710M	
D9A53	264P045040	DIODE - 1S24710M	
D9A54	264P045040	DIODE - 1S24710M	
D9A55	264P045040	DIODE - 1S24710M	
D9A56	264P566010	DIODE - FMP-G12S	
D9A57	264P899010	DIODE - BYV26E	
D9A58	264P588010	DIODE - FML-G16S	
D9A64	264P045040	DIODE - 1S24710M	
D9A65	264P045040	DIODE - 1S24710M	
D9A66	264P045040	DIODE - 1S24710M	
D9B01	264P718010	DIODE - FR155	
D9B04	264P458050	DIODE - RD3.9EB1	
D9B05	264P484040	DIODE - RD5.6FB3	
D9C00	264D056020	DIODE - S5500D/EM1Z/ERB12-02RK	
		COILS	
L1A06	409P923060	EMI-F-CHIP - BLM21B272S	
L1A07	409P923060	EMI-F-CHIP - BLM21B272S	
L1A09	325C146030	COIL-CHIP - 10MH-J	
L1A13	409P923060	EMI-F-CHIP - BLM21B272S	
L1A50	325C146030	COIL-CHIP - 10MH-J	
L1A51	321C114010	COIL-RF - 2200MH-J	
L1B06	409P923060	EMI-F-CHIP - BLM21B272S	
L1B07	409P923060	EMI-F-CHIP - BLM21B272S	
L1B09	325C146030	COIL-CHIP - 10MH-J	
L1B13	409P923060	EMI-F-CHIP - BLM21B272S	
L1B50	325C146030	COIL-CHIP - 10MH-J	
L1B51	321C114010	COIL-RF - 2200MH-J	
L2A00	325C241030	COIL-CHIP - 10MH-K	
L2A60	325C241030	COIL-CHIP - 10MH-K	
L2B00	325C241030	COIL-CHIP - 10MH-K	
L2C01	325C146050	COIL-CHIP - 15MH-J	
L2C03	409P777080	EMI-F-CHIP - BLM21P221S	
L2C05	409P777080	EMI-F-CHIP - BLM21P221S	
L2C06	409P777080	EMI-F-CHIP - BLM21P221S	
L2D01	325C146030	COIL-CHIP - 10MH-J	
L2D03	325C146030	COIL-CHIP - 10MH-J	
L2D08	409P777080	EMI-F-CHIP - BLM21P221S	
L2D20	325C146030	COIL-CHIP - 10MH-J	
L2E03	409P777080	EMI-F-CHIP - BLM21P221S	
L2E25	409P777080	EMI-F-CHIP - BLM21P221S	
L2F50	409P923060	EMI-F-CHIP - BLM21B272S	
L2F60	409P777080	EMI-F-CHIP - BLM21P221S	
L2F70	409P923060	EMI-F-CHIP - BLM21B272S	
L2F80	409P923060	EMI-F-CHIP - BLM21B272S	
L2H60	325C146030	COIL-CHIP - 10MH-J	
L2H61	325C146030	COIL-CHIP - 10MH-J	
L2J30	409P777050	EMI-F-CHIP - BLM21B201S	
L2J31	409P777050	EMI-F-CHIP - BLM21B201S	
L2J32	409P777050	EMI-F-CHIP - BLM21B201S	
L2J33	409P777050	EMI-F-CHIP - BLM21B201S	
L2J34	409P777050	EMI-F-CHIP - BLM21B201S	
L2J35	409P777050	EMI-F-CHIP - BLM21B201S	
L2K42	409P777080	EMI-F-CHIP - BLM21P221S	
L2L42	409P777080	EMI-F-CHIP - BLM21P221S	
L2M00	409P777080	EMI-F-CHIP - BLM21P221S	
L2M20	409P777080	EMI-F-CHIP - BLM21P221S	
L2V06	409P923060	EMI-F-CHIP - BLM21B272S	
L2V72	409P923060	EMI-F-CHIP - BLM21B272S	
L2V90	409P923060	EMI-F-CHIP - BLM21B272S	
L2V95	409P923060	EMI-F-CHIP - BLM21B272S	
L2W01	409P923060	EMI-F-CHIP - BLM21B272S	
L2W02	409P923060	EMI-F-CHIP - BLM21B272S	
L2W03	409P923060	EMI-F-CHIP - BLM21B272S	
L2W04	409P923060	EMI-F-CHIP - BLM21B272S	
L2W05	409P923060	EMI-F-CHIP - BLM21B272S	
L2X30	409P923060	EMI-F-CHIP - BLM21B272S	
L2Y00	409P923060	EMI-F-CHIP - BLM21B272S	
L2Y10	409P923060	EMI-F-CHIP - BLM21B272S	
L2Y30	409P923060	EMI-F-CHIP - BLM21B272S	
L3A37	409P923060	EMI-F-CHIP - BLM21B272S	
L4A02	325C461030	COIL-PEAKING - 10MH-K	
L4A03	409P777080	EMI-F-CHIP - BLM21P221S	
L4B01	321C130010	COIL-RF - 2MH	
L4B02	321C130090	COIL-RF - 10MH-K	
L5A31	411P001010	LEAD-FERRITE	
L5A33	333P052030	COIL-HORIZ-LIN	
L5A34	321C130010	COIL-RF - 2MH	
L5A51	321C141030	COIL-RF - 10MH-K	
L5A52	321C141030	COIL-RF - 10MH-K	
L5A53	321C141010	COIL-RF - 6.8MH-M	
L5A54	411D009020	CORE-FERRITE	
L5A55	411D009020	CORE-FERRITE	
L5F00	409P923060	EMI-F-CHIP - BLM21B272S	
L5H41	325C110090	COIL-PEAKING - 4.7MH-K	
L6B01	411P012010	BEAD-FERRITE	
L6B02	411P012010	BEAD-FERRITE	
L6G01	411P012010	BEAD-FERRITE	
L6G02	411P012010	BEAD-FERRITE	
L6R01	411P012010	BEAD-FERRITE	
L6R02	411P012010	BEAD-FERRITE	
L6R04	321C141010	COIL-RF - 6.8MH-M	
L7A30	409P923060	EMI-F-CHIP - BLM21B272S	
L7A99	409P923060	EMI-F-CHIP - BLM21B272S	
L7B00	409P923060	EMI-F-CHIP - BLM21B272S	
L7B76	409P923060	EMI-F-CHIP - BLM21B272S	
L7B80	409P923060	EMI-F-CHIP - BLM21B272S	
L7C00	325C146030	COIL-CHIP - 10MH-J	
L7C10	409P923060	EMI-F-CHIP - BLM21B272S	
L7C20	409P777050	EMI-F-CHIP - BLM21B201S	
L7C24	409P777050	EMI-F-CHIP - BLM21B201S	
L7C25	409P777050	EMI-F-CHIP - BLM21B201S	
L7D01	325C241030	COIL-CHIP - 10MH-K	
L7D11	325C242010	COIL-CHIP - 47MH-K	
L7D12	409P777020	EMI-F-CHIP - BLM21A05	
L7D13	325C241030	COIL-CHIP - 10MH-K	
L7D14	325C241030	COIL-CHIP - 10MH-K	
L7D15	325C241030	COIL-CHIP - 10MH-K	
L7E01	325C241030	COIL-CHIP - 10MH-K	

[#] Model Legend: (1) WS-55859, (2) WS-55909, (3) WS-65869, (4) WS-65909, (5) WS-73909

Ref #	Part #	Part Name & Description	[#]
L7E11	325C242010	COIL-CHIP - 47MH-K	
L7E12	409P777020	EMI-F-CHIP - BLM21A05	
L7E13	325C241030	COIL-CHIP - 10MH-K	
L7E14	325C241030	COIL-CHIP - 10MH-K	
L7E15	325C241030	COIL-CHIP - 10MH-K	
L7G00	325C242050	COIL-CHIP - 100MH-K	
L7G10	325C242050	COIL-CHIP - 100MH-K	
L7G11	325C241030	COIL-CHIP - 10MH-K	
L7G12	325C241030	COIL-CHIP - 10MH-K	
L7H10	325C241030	COIL-CHIP - 10MH-K	
L7H11	409P777080	EMI-F-CHIP - BLM21P221S	
L7H12	325C241030	COIL-CHIP - 10MH-K	
L7H13	325C241030	COIL-CHIP - 10MH-K	
L7H14	325C241030	COIL-CHIP - 10MH-K	
L7H15	325C241030	COIL-CHIP - 10MH-K	
L7H16	325C241030	COIL-CHIP - 10MH-K	
L7H17	325C241030	COIL-CHIP - 10MH-K	
L7H19	409P777080	EMI-F-CHIP - BLM21P221S	
L7H20	325C241030	COIL-CHIP - 10MH-K	
L7H30	325C241030	COIL-CHIP - 10MH-K	
L7H31	325C241030	COIL-CHIP - 10MH-K	
L7H32	409P777080	EMI-F-CHIP - BLM21P221S	
L7H38	325C241030	COIL-CHIP - 10MH-K	
L7H40	325C241030	COIL-CHIP - 10MH-K	
L7H41	409P777080	EMI-F-CHIP - BLM21P221S	
L7H42	409P777080	EMI-F-CHIP - BLM21P221S	
L7H50	409P777080	EMI-F-CHIP - BLM21P221S	
L7H60	325C241030	COIL-CHIP - 10MH-K	
L7H70	325C241030	COIL-CHIP - 10MH-K	
L7H80	325C241030	COIL-CHIP - 10MH-K	
L7K01	325C121030	COIL-PEAKING - 10MH-K	
L7V01	409P923060	EMI-F-CHIP - BLM21B272S	
L80	325C140050	COIL-CHIP - 2.2MH-M/K/J	
L8C01	321C141070	COIL-RF - 22MH-K	
L8C02	321C141070	COIL-RF - 22MH-K	
L8D01	409P777080	EMI-F-CHIP - BLM21P221S	
L8D02	409P777080	EMI-F-CHIP - BLM21P221S	
L8D03	409P777080	EMI-F-CHIP - BLM21P221S	
L8D04	409P777080	EMI-F-CHIP - BLM21P221S	
L8D05	409P777080	EMI-F-CHIP - BLM21P221S	
L8D06	409P777080	EMI-F-CHIP - BLM21P221S	
L8D07	409P777080	EMI-F-CHIP - BLM21P221S	
L8G00	409P777080	EMI-F-CHIP - BLM21P221S	
L8G01	409P777080	EMI-F-CHIP - BLM21P221S	
L9A02	**351P223010**	**LINE FILTER - SLF15N0601**	
L9A20	411D009020	CORE-FERRITE	
L9A21	411D009020	CORE-FERRITE	
L9A22	321C141020	COIL-RF - 8.2MH	
L9A23	321C141020	COIL-RF - 8.2MH	
L9A24	321C141070	COIL-RF - 22MH-K	
L9A50	411D009020	CORE-FERRITE	
L9A51	411D009020	CORE-FERRITE	
L9A52	411D009020	CORE-FERRITE	
L9A53	321C141010	COIL-RF - 6.8MH-M	
L9A54	411D009020	CORE-FERRITE	
L9A55	321C142030	COIL-RF - 68MH-K	
L9A56	411D009020	CORE-FERRITE	
L9A57	321C141070	COIL-RF - 22MH-K	
L9A58	321C141070	COIL-RF - 22MH-K	
L9A59	321C141070	COIL-RF - 22MH-K	

Ref #	Part #	Part Name & Description	[#]
L9A60	321C141070	COIL-RF - 22MH-K	
L9A62	321C141010	COIL-RF - 6.8MH-M	
L9A63	321C141010	COIL-RF - 6.8MH-M	
L9A64	321C130090	COIL-RF - 10MH-K	
L9A65	321C141010	COIL-RF - 6.8MH-M	
L9A66	321C141070	COIL-RF - 22MH-K	
L9A67	321C130090	COIL-RF - 10MH-K	
L9B01	321C140060	COIL-RF - 2.7MH-M 9X9.5	
L9B02	321C141070	COIL-RF - 22MH-K	
L9B03	321C140060	COIL-RF - 2.7MH-M 9X9.5	
L9B04	321C140060	COIL-RF - 2.7MH-M 9X9.5	
L9D00	**351P222010**	**LINE FILTER - ELF24V050A**	
L9D01	**351P222010**	**LINE FILTER - ELF24V050A**	
LC2J01	409P876060	EMI-F-CHIP - CNF20R102S/CKD510JB1H102S	
LC2J02	409P876060	EMI-F-CHIP - CNF20R102S/CKD510JB1H102S	
LC2J03	409P876060	EMI-F-CHIP - CNF20R102S/CKD510JB1H102S	
LC2J04	409P876060	EMI-F-CHIP - CNF20R102S/CKD510JB1H102S	
LC2J05	409P876060	EMI-F-CHIP - CNF20R102S/CKD510JB1H102S	
LC7D02	409P875090	EMI-F-CHIP - ELKE103FA	
LC7D05	409P875090	EMI-F-CHIP - ELKE103FA	
LC7D10	409P876020	EMI-F-CHIP - CNF20C470S/CKD510JB1H470S	
LC7D11	409P876020	EMI-F-CHIP - CNF20C470S/CKD510JB1H470S	
LC7D12	409P876020	EMI-F-CHIP - CNF20C470S/CKD510JB1H470S	
LC7D13	409P876020	EMI-F-CHIP - CNF20C470S/CKD510JB1H470S	
LC7D14	409P876020	EMI-F-CHIP - CNF20C470S/CKD510JB1H470S	
LC7E10	409P876020	EMI-F-CHIP - CNF20C470S/CKD510JB1H470S	
LC7E11	409P876020	EMI-F-CHIP - CNF20C470S/CKD510JB1H470S	
LC7E12	409P876020	EMI-F-CHIP - CNF20C470S/CKD510JB1H470S	
LC7E13	409P876020	EMI-F-CHIP - CNF20C470S/CKD510JB1H470S	
LC7E14	409P876020	EMI-F-CHIP - CNF20C470S/CKD510JB1H470S	
LC7G01	409P876020	EMI-F-CHIP - CNF20C470S/CKD510JB1H470S	
LC7G02	409P876020	EMI-F-CHIP - CNF20C470S/CKD510JB1H470S	
LC7G03	409P876020	EMI-F-CHIP - CNF20C470S/CKD510JB1H470S	
LC7G04	409P876020	EMI-F-CHIP - CNF20C470S/CKD510JB1H470S	
LC7G05	409P876020	EMI-F-CHIP - CNF20C470S/CKD510JB1H470S	
LC7G06	409P876020	EMI-F-CHIP - CNF20C470S/CKD510JB1H470S	
LC7G07	409P876020	EMI-F-CHIP - CNF20C470S/CKD510JB1H470S	
LC7G08	409P875090	EMI-F-CHIP - ELKE103FA	
LC7G09	409P875090	EMI-F-CHIP - ELKE103FA	
LC7G10	409P876020	EMI-F-CHIP - CNF20C470S/CKD510JB1H470S	
LC7G11	409P876020	EMI-F-CHIP - CNF20C470S/CKD510JB1H470S	
LC7G12	409P876020	EMI-F-CHIP - CNF20C470S/CKD510JB1H470S	
LC7G13	409P876020	EMI-F-CHIP - CNF20C470S/CKD510JB1H470S	
LC7G14	409P876020	EMI-F-CHIP - CNF20C470S/CKD510JB1H470S	
LC7G15	409P876020	EMI-F-CHIP - CNF20C470S/CKD510JB1H470S	
LC7J03	409P876020	EMI-F-CHIP - CNF20C470S/CKD510JB1H470S	
LC7J04	409P876020	EMI-F-CHIP - CNF20C470S/CKD510JB1H470S	
LC7J05	409P876020	EMI-F-CHIP - CNF20C470S/CKD510JB1H470S	
LC7J10	409P876020	EMI-F-CHIP - CNF20C470S/CKD510JB1H470S	
LC7J13	409P876020	EMI-F-CHIP - CNF20C470S/CKD510JB1H470S	
LC7J14	409P876020	EMI-F-CHIP - CNF20C470S/CKD510JB1H470S	
LC7J15	409P876020	EMI-F-CHIP - CNF20C470S/CKD510JB1H470S	
LF56A1	409P900010	LP-FILTER - 7MHZ SMD	
LF7D00	409P901010	LP-FILTER - 14MHZ SMD	
LF7D01	409P901010	LP-FILTER - 14MHZ SMD	
LF7D02	409P901010	LP-FILTER - 14MHZ SMD	
LF7E00	409P901010	LP-FILTER - 14MHZ SMD	
LF7E01	409P901010	LP-FILTER - 14MHZ SMD	
LF7E02	409P901010	LP-FILTER - 14MHZ SMD	
LF7G00	409P901010	LP-FILTER - 14MHZ SMD	

[#] Model Legend: (1) WS-55859, (2) WS-55909, (3) WS-65869, (4) WS-65909, (5) WS-73909

Ref #	Part #	Part Name & Description	[#]
LF7G01	409P901010	LP-FILTER - 14MHZ SMD	
LF7G02	409P901010	LP-FILTER - 14MHZ SMD	

TRANSFORMERS

T5A31	**349P216010**	**TRANS-HORIZ**	
T5A32	**336P040010**	**TRANS-HORIZ-DRIVE**	
T5A51	**334P278010**	**TRANS-FLYBACK**	
T9A20	**350P766020**	**TRANS-POWER**	
T9A50	**350P765010**	**TRANS-POWER**	

VARIABLE RESISTORS

	129P059050	VR-FOCUS - MHF116-50W	
RV9D00	**265P100010**	**VARISTOR - ERZV10D271/ERZVEAV271**	

RESISTORS

R-M-CHIP Type Resistors (Listed by Value)

Value	Part No.	Value	Part No.
1/16W 0OHM	103P509050	1/16W 2.2K-F	103P493030
1/10W 10-J	103P400010	1/16W 2.2K-J	103P502090
1/16W 10-J	103P500010	1/16W 2.4K-F	103P493040
1/16W 15-J	103P500030	1/16W 2.7K-J	103P503000
1/10W 22-J	103P400050	1/16W 3K-F	103P493060
1/16W 22-J	103P500050	1/16W 3.3K-F	103P493070
1/16W 33-J	103P500070	1/16W 3.3K-J	103P503010
1/16W 47-J	103P500090	1/16W 3.3M-J	103P506070
1/10W 56-J	103P401000	1/16W 3.9K-F	103P493090
1/16W 56-D	103P844030	1/16W 3.9K-J	103P503020
1/16W 56-J	103P501000	1/16W 4.7K-F	103P494010
1/4W 75-J	103P489090	1/16W 4.7K-J	103P503030
1/16W 100-J	103P501030	1/16W 5.1K-F	103P494020
1/16W 120-J	103P501040	1/16W 5.6K-J	103P503040
1/16W 150-D	103P810050	1/16W 6.2K-D	103P814040
1/16W 150-J	103P501050	1/16W 6.2K-F	103P494040
1/16W 160-F	103P490060	1/16W 6.8K-F	103P494050
1/10W 180-F	103P470070	1/16W 6.8K-J	103P503050
1/16W 180-J	103P501060	1/16W 8.2K-F	103P494070
1/16W 220-J	103P501070	1/16W 8.2K-J	103P503060
1/16W 240-F	103P491000	1/16W 10K-F	103P494090
1/16W 300-F	103P491020	1/16W 10K-J	103P503070
1/10W 330-J	103P401090	1/16W 12K-J	103P503080
1/16W 330-F	103P491030	1/16W 13K-F	103P495020
1/16W 330-J	103P501090	1/16W 15K-J	103P503090
1/16W 360-F	103P491040	1/16W 16K-F	103P495040
1/16W 390-F	103P491050	1/16W 18K-J	103P504000
1/16W 390-J	103P502000	1/16W 22K-F	103P495070
1/16W 470-J	103P502010	1/16W 22K-J	103P504010
1/4W 470-J	103P482010	1/16W 24K-F	103P495080
1/16W 510-F	103P491080	1/16W 27K-F	103P495090
1/16W 560-F	103P491090	1/16W 27K-J	103P504020
1/16W 560-J	103P502020	1/16W 33K-J	103P504030
1/16W 620-F	103P492000	1/16W 39K-J	103P504040
1/16W 680-F	103P492010	1/16W 47K-F	103P496050
1/16W 680-J	103P502030	1/16W 47K-J	103P504050
1/16W 820-J	103P502040	1/16W 56K-J	103P504060
1/16W 1K-J	103P502050	1/16W 68K-J	103P504070
1/16W 1K-F	103P492050	1/16W 75K-J	103P509090
1/16W 1.2K-F	103P492070	1/16W 82K-J	103P504080
1/16W 1.2K-J	103P502060	1/16W 100K-F	103P497030
1/16W 1.3K-F	103P492080	1/16W 100K-J	103P504090

Ref #	Part #	Part Name & Description	[#]

Value	Part No.	Value	Part No.
1/10W 1.5K-F	103P472090	1/16W 120K-J	103P505000
1/10W 1.5K-J	103P402070	1/16W 150K-J	103P505010
1/16W 1.5K-F	103P492090	1/16W 330K-J	103P505050
1/16W 1.5K-J	103P502070	1/16W 560K-J	103P505080
1/16W 1.6K-F	103P493000	1/16W 680K-J	103P505090
1/16W 1.8K-F	103P493010	1/16W 820K-J	103P506000
1/16W 1.8K-J	103P502080	1/16W 1M-J	103P506010
1/16W 2K-F	103P493020		

Conventional Resistors (By Ref #)

Ref #	Part #	Description	[#]
R2M01	103P711080	R-CARBON - 1/4W 270-J	
R2M06	103P711080	R-CARBON - 1/4W 270-J	
R2M10	103P711080	R-CARBON - 1/4W 270-J	
R3E02	103P712080	R-CARBON - 1/4W 1.8K-J	
R3E04	103P712080	R-CARBON - 1/4W 1.8K-J	
R3E05	103P714060	R-CARBON - 1/4W 56K-J	
R3E06	103P713070	R-CARBON - 1/4W 10K-J	
R3E15	103P713050	R-CARBON - 1/4W 6.8K-J	
R3E16	103P713050	R-CARBON - 1/4W 6.8K-J	
R4B05	103P713090	R-CARBON - 1/4W 15K-J	
R4B10	103C188050	R-METAL - 2W 2.7-J	
R4B12	103C188040	R-METAL - 2W 2.2-J	
R4B17	103P712010	R-CARBON - 1/4W 470-J	
R4B20	103P711090	R-CARBON - 1/4W 330-J	
R4B22	103P712090	R-CARBON - 1/4W 2.2K-J	1-4
R4B23	103P711070	R-CARBON - 1/4W 220-J	
R4B24	103P712050	R-CARBON - 1/4W 1K-J	
R4B25	103P712050	R-CARBON - 1/4W 1K-J	
R4B26	103P713000	R-CARBON - 1/4W 2.7K-J	
R4B27	103P714080	R-CARBON - 1/4W 82K-J	
R4B28	103P464040	R-METAL - 1/4W 2.4K-F	
R5290	103C188040	R-METAL - 2W 2.2-J	
R54E4	103C180020	R-METAL - 2W 12-J	
R54E5	103C180020	R-METAL - 2W 12-J	
R5A01	103P712050	R-CARBON - 1/4W 1K-J	
R5A02	103P712090	R-CARBON - 1/4W 2.2K-J	
R5A03	103P713010	R-CARBON - 1/4W 3.3K-J	
R5A04	103P713090	R-CARBON - 1/4W 15K-J	
R5A05	103P713070	R-CARBON - 1/4W 10K-J	
R5A06	103P713070	R-CARBON - 1/4W 10K-J	
R5A07	103P714030	R-CARBON - 1/4W 33K-J	
R5A08	103C194010	R-METAL - 3W 22K-J	
R5A09	103P714040	R-CARBON - 1/4W 39K-J	
R5A10	103P714040	R-CARBON - 1/4W 39K-J	
R5A11	103P713070	R-CARBON - 1/4W 10K-J	
R5A12	103P712050	R-CARBON - 1/4W 1K-J	
R5A15	103P713010	R-CARBON - 1/4W 3.3K-J	
R5A16	103P713090	R-CARBON - 1/4W 15K-J	
R5A17	103P712050	R-CARBON - 1/4W 1K-J	
R5A18	103P711030	R-CARBON - 1/4W 100-J	
R5A19	103P461070	R-METAL - 1/4W 470-F	
R5A20	103P714050	R-CARBON - 1/4W 47K-J	
R5A21	103P713000	R-CARBON - 1/4W 2.7K-J	
R5A22	103P714010	R-CARBON - 1/4W 22K-J	
R5A23	103P713030	R-CARBON - 1/4W 4.7K-J	
R5A24	103P714070	R-CARBON - 1/4W 68K-J	
R5A25	103P712010	R-CARBON - 1/4W 470-J	
R5A26	103P712090	R-CARBON - 1/4W 2.2K-J	

[#] Model Legend: (1) WS-55859, (2) WS-55909, (3) WS-65869, (4) WS-65909, (5) WS-73909

Ref #	Part #	Part Name & Description	[#]
R5A29	103P714010	R-CARBON - 1/4W 22K-J	
R5A30	103C181060	R-METAL - 2W 180-J	
R5A31	103P711030	R-CARBON - 1/4W 100-J	
R5A34	103P711010	R-CARBON - 1/4W 68-J	
R5A36	103C393020	R-METAL-P - 3W 3.9K-J	
R5A37	103C393010	R-METAL-P - 3W 3.3K-J	
R5A38	103C397070	R-METAL-P - 3W 0.56-K	
R5A39	103C170050	R-METAL - 1W 22-J	
R5A40	103P714090	R-CARBON - 1/4W 100K-J	
R5A41	103P714040	R-CARBON - 1/4W 39K-J	
R5A42	103P713030	R-CARBON - 1/4W 4.7K-J	
R5A43	103P714010	R-CARBON - 1/4W 22K-J	
R5A45	103C393080	R-METAL-P - 3W 12K-J	
R5A46	103C391050	R-METAL-P - 3W 150-J	
R5A47	103P714030	R-CARBON - 1/4W 33K-J	
R5A49	103P713050	R-CARBON - 1/4W 6.8K-J	
R5A50	103P712090	R-CARBON - 1/4W 2.2K-J	
R5A51	**102P107000**	**R-WIRE - 2W 0.15-K**	
R5A52	**103P712010**	**R-CARBON - 1/4W 470-J**	
R5A53	**103P711000**	**R-CARBON - 1/4W 56-J**	
R5A54	103C190090	R-METAL - 3W 47-J	
R5A55	**103P712050**	**R-CARBON - 1/4W 1K-J**	
R5A56	**103P715060**	**R-CARBON - 1/4W 390K-J**	
R5A57	103P711030	R-CARBON - 1/4W 100-J	
R5A59	**103P461030**	**R-METAL - 1/4W 330-F**	
R5A60	**103P463010**	**R-METAL - 1/4W 1.8K-F**	
R5A61	**103P713060**	**R-CARBON - 1/4W 8.2K-J**	
R5A62	103P711030	R-CARBON - 1/4W 100-J	
R5A63	103P713090	R-CARBON - 1/4W 15K-J	
R5A64	**103P714090**	**R-CARBON - 1/4W 100K-J**	
R5A65	**103P141030**	**R-CARBON - 1/2W 100-J**	
R5A68	**103P463040**	**R-METAL - 1/4W 2.4K-F**	**5**
R5A68	**103P463080**	**R-METAL - 1/4W 2.4K-F**	**1-4**
R5A69	**103P460090**	**R-METAL - 1/4W 220-F**	
R5A70	**103P463040**	**R-METAL - 1/4W 2.4K-F**	**5**
R5A71	**103P713070**	**R-CARBON - 1/4W 10K-J**	
R5A72	**103P461070**	**R-METAL - 1/4W 470-F**	
R5A73	**103P714080**	**R-CARBON - 1/4W 82K-J**	
R5A74	**103P713070**	**R-CARBON - 1/4W 10K-J**	
R5A75	**103P713070**	**R-CARBON - 1/4W 10K-J**	
R5A76	**103P713070**	**R-CARBON - 1/4W 10K-J**	
R5A78	**103P714010**	**R-CARBON - 1/4W 22K-J**	
R5A81	103P711030	R-CARBON - 1/4W 100-J	
R5A82	**103P370090**	**R-FUSE - 1/4W 47-J**	
R5A83	**103P464070**	**R-METAL - 1/4W 8.2K-F**	
R5A84	**103P464070**	**R-METAL - 1/4W 8.2K-F**	
R5A85	103P711010	R-CARBON - 1/4W 68-J	
R5A87	103P711030	R-CARBON - 1/4W 100-J	
R5A88	103P464000	R-METAL - 1/4W 4.3K-F	
R5A89	103P463050	R-METAL - 1/4W 2.7K-F	
R5A90	103P713030	R-CARBON - 1/4W 4.7K-J	
R5A91	103P714090	R-CARBON - 1/4W 100K-J	
R5A92	**103P713070**	**R-CARBON - 1/4W 10K-J**	
R5A96	103P713070	R-CARBON - 1/4W 10K-J	
R5A97	**103P711030**	**R-CARBON - 1/4W 100-J**	
R5A98	103C197090	R-METAL - 3W 0.82-J	1-4
R5A98	103C198010	R-METAL - 3W 1.2-J	5
R5A99	103P714020	R-CARBON - 1/4W 27K-J	
R5B01	103P712010	R-CARBON - 1/4W 470-J	
R5H02	103P750010	R-FUSE - 1/4W 10-J	

Ref #	Part #	Part Name & Description	[#]
R5H03	103P715000	R-CARBON - 1/4W 120K-J	
R5H04	103P712010	R-CARBON - 1/4W 470-J	
R5H05	103P712060	R-CARBON - 1/4W 1.2K-J	
R5H06	103P712060	R-CARBON - 1/4W 1.2K-J	
R5H22	103P712010	R-CARBON - 1/4W 470-J	
R5H40	103P712020	R-CARBON - 1/4W 560-J	
R5H41	103P712060	R-CARBON - 1/4W 1.2K-J	
R5H42	103P711050	R-CARBON - 1/4W 150-J	
R5H47	103C170090	R-METAL - 1W 47-J	
R5H48	103P712060	R-CARBON - 1/4W 1.2K-J	
R5H49	103P714070	R-CARBON - 1/4W 68K-J	
R5H50	103P714070	R-CARBON - 1/4W 68K-J	
R5H51	103P712060	R-CARBON - 1/4W 1.2K-J	
R5H53	103P715000	R-CARBON - 1/4W 120K-J	
R5H55	103P141000	R-CARBON - 1/2W 56-J	
R5H56	103P141000	R-CARBON - 1/2W 56-J	
R5H59	103C181030	R-METAL - 2W 100-J	
R5H60	103C178080	R-METAL - 1W 4.7-J	
R5H84	103P713040	R-CARBON - 1/4W 5.6K-J	
R5K09	103P762020	R-FUSE - 1/2W 560-J	
R5K10	103P711010	R-CARBON - 1/4W 68-J	
R5K12	**103P760060**	**R-FUSE - 1/2W 27-J**	
R5K19	103P464000	R-METAL - 1/4W 4.3K-F	
R5K20	103P712060	R-CARBON - 1/4W 1.2K-J	
R5K21	103P713070	R-CARBON - 1/4W 10K-J	
R5K25	103P713040	R-CARBON - 1/4W 5.6K-J	
R5K31	103P711030	R-CARBON - 1/4W 100-J	
R5K34	**103P760060**	**R-FUSE - 1/2W 27-J**	
R5K46	103P712010	R-CARBON - 1/4W 470-J	
R5K50	103P762050	R-FUSE - 1/2W 1K-J	
R6B01	103P711030	R-CARBON - 1/4W 100-J	
R6B02	103P714010	R-CARBON - 1/4W 22K-J	
R6B03	103P714010	R-CARBON - 1/4W 22K-J	
R6B06	103P462010	R-METAL - 1/4W 680-F	
R6B07	103P711030	R-CARBON - 1/4W 100-J	
R6B09	103P711030	R-CARBON - 1/4W 100-J	
R6B10	103P711030	R-CARBON - 1/4W 100-J	
R6B11	103C194010	R-METAL - 3W 22K-J	
R6B15	103P711030	R-CARBON - 1/4W 100-J	
R6B18	103P711030	R-CARBON - 1/4W 100-J	
R6B21	103P712060	R-CARBON - 1/4W 1.2K-J	
R6B22	103P711030	R-CARBON - 1/4W 100-J	
R6G01	103P711030	R-CARBON - 1/4W 100-J	
R6G02	103P714010	R-CARBON - 1/4W 22K-J	
R6G03	103P714010	R-CARBON - 1/4W 22K-J	
R6G06	103P462020	R-METAL - 1/4W 750-F	
R6G07	103P711030	R-CARBON - 1/4W 100-J	
R6G09	103P711030	R-CARBON - 1/4W 100-J	
R6G10	103P711030	R-CARBON - 1/4W 100-J	
R6G11	103C194010	R-METAL - 3W 22K-J	
R6G21	103P712060	R-CARBON - 1/4W 1.2K-J	
R6R01	103P711030	R-CARBON - 1/4W 100-J	
R6R02	103P714010	R-CARBON - 1/4W 22K-J	
R6R03	103P714010	R-CARBON - 1/4W 22K-J	
R6R06	103P462040	R-METAL - 1/4W 910-F	
R6R07	103P711030	R-CARBON - 1/4W 100-J	
R6R09	103P711030	R-CARBON - 1/4W 100-J	
R6R10	103P711030	R-CARBON - 1/4W 100-J	
R6R11	103C194010	R-METAL - 3W 22K-J	
R6R19	103P464050	R-METAL - 1/4W 6.8K-F	

[#] Model Legend: (1) WS-55859, (2) WS-55909, (3) WS-65869, (4) WS-65909, (5) WS-73909

Ref #	Part #	Part Name & Description	[#]
R6R21	103P712060	R-CARBON - 1/4W 1.2K-J	
R6R22	103P711030	R-CARBON - 1/4W 100-J	
R7C34	103C178010	R-METAL - 1W 1.2-J	
R7K01	103P712050	R-CARBON - 1/4W 1K-J	
R7K02	103P713010	R-CARBON - 1/4W 3.3K-J	
R7K21	103P711080	R-CARBON - 1/4W 270-J	
R7K22	103P715030	R-CARBON - 1/4W 220K-J	
R7K23	103P713080	R-CARBON - 1/4W 12K-J	
R7K24	103P713080	R-CARBON - 1/4W 12K-J	
R7K25	103P713080	R-CARBON - 1/4W 12K-J	
R7K26	103P715030	R-CARBON - 1/4W 220K-J	
R7K27	103P713070	R-CARBON - 1/4W 10K-J	
R7K28	103P711050	R-CARBON - 1/4W 150-J	
R7K29	103P712060	R-CARBON - 1/4W 1.2K-J	
R7K30	103P713070	R-CARBON - 1/4W 10K-J	
R7K31	103P715030	R-CARBON - 1/4W 220K-J	
R7K32	103P713030	R-CARBON - 1/4W 4.7K-J	
R7K34	103P713000	R-CARBON - 1/4W 2.7K-J	
R7K35	103P711030	R-CARBON - 1/4W 100-J	
R7L26	103P462090	R-METAL - 1/4W 1.5K-F	
R7L29	103P464030	R-METAL - 1/4W 5.6K-F	
R7L32	103P466070	R-METAL - 1/4W 56K-F	
R8C03	103P711090	R-CARBON - 1/4W 330-J	
R8C07	103C391050	R-METAL-P - 3W 150-J	
R8C11	103P711090	R-CARBON - 1/4W 330-J	
R8C15	103C391050	R-METAL-P - 3W 150-J	
R8C19	103P711090	R-CARBON - 1/4W 330-J	
R8C23	103C391050	R-METAL-P - 3W 150-J	
R8C27	103P711090	R-CARBON - 1/4W 330-J	
R8C31	103C391050	R-METAL-P - 3W 150-J	
R8C35	103P711090	R-CARBON - 1/4W 330-J	
R8C39	103C391050	R-METAL-P - 3W 150-J	
R8C43	103P711090	R-CARBON - 1/4W 330-J	
R8C47	103C391050	R-METAL-P - 3W 150-J	
R8C60	103C191090	R-METAL - 3W 330-J	
R8C61	103C191090	R-METAL - 3W 330-J	
R8C62	103P713010	R-CARBON - 1/4W 3.3K-J	
R8C63	103P713010	R-CARBON - 1/4W 3.3K-J	
R8C64	103P713010	R-CARBON - 1/4W 3.3K-J	
R8C65	103P713010	R-CARBON - 1/4W 3.3K-J	
R8C66	103P713010	R-CARBON - 1/4W 3.3K-J	
R8C67	103P713010	R-CARBON - 1/4W 3.3K-J	
R9A02	102P338040	R-CEMENT-WIRE - 15W 2.2-K	
R9A03	**109C010010**	**R-COMPOSITION - 1/2W 1M-K**	
R9A05	**109C010010**	**R-COMPOSITION - 1/2W 1M-K**	
R9A06	**109C010010**	**R-COMPOSITION - 1/2W 1M-K**	
R9A10	103P713040	R-CARBON - 1/4W 5.6K-J	
R9A12	103P713030	R-CARBON - 1/4W 4.7K-J	
R9A20	103P713010	R-CARBON - 1/4W 3.3K-J	
R9A21	103C393090	R-METAL-P - 3W 15K-J	
R9A22	103C183070	R-METAL - 2W 10K-J	
R9A24	103P713040	R-CARBON - 1/4W 5.6K-J	
R9A25	103P713010	R-CARBON - 1/4W 3.3K-J	
R9A26	103P712030	R-CARBON - 1/4W 680-J	
R9A27	103C187050	R-METAL - 2W 0.39-J	
R9A28	103P711070	R-CARBON - 1/4W 220-J	
R9A29	103C187050	R-METAL - 2W 0.39-J	
R9A30	103P712090	R-CARBON - 1/4W 2.2K-J	
R9A31	103P712050	R-CARBON - 1/4W 1K-J	
R9A32	103P713070	R-CARBON - 1/4W 10K-J	
R9A33	103P711030	R-CARBON - 1/4W 100-J	
R9A35	103P715010	R-CARBON - 1/4W 150K-J	
R9A36	103P714090	R-CARBON - 1/4W 100K-J	
R9A37	103P712090	R-CARBON - 1/4W 2.2K-J	
R9A38	103P713030	R-CARBON - 1/4W 4.7K-J	
R9A39	103P711030	R-CARBON - 1/4W 100-J	
R9A40	103P712010	R-CARBON - 1/4W 470-J	
R9A41	103P712050	R-CARBON - 1/4W 1K-J	
R9A42	103P712050	R-CARBON - 1/4W 1K-J	
R9A44	103P463050	R-METAL - 1/4W 2.7K-F	
R9A51	103P715050	R-CARBON - 1/4W 330K-J	
R9A53	103P712030	R-CARBON - 1/4W 680-J	
R9A54	102P107000	R-WIRE - 2W 0.15-K	
R9A55	102P106090	R-WIRE - 2W 0.12-K	
R9A56	103P713010	R-CARBON - 1/4W 3.3K-J	
R9A57	103P713010	R-CARBON - 1/4W 3.3K-J	
R9A60	103P714050	R-CARBON - 1/4W 47K-J	
R9A61	103P713040	R-CARBON - 1/4W 5.6K-J	
R9A62	103P713070	R-CARBON - 1/4W 10K-J	
R9A63	103P713020	R-CARBON - 1/4W 3.9K-J	
R9A66	103P713070	R-CARBON - 1/4W 10K-J	
R9A68	103C180050	R-METAL - 2W 22-J	
R9A69	103C180050	R-METAL - 2W 22-J	
R9A75	103P714090	R-CARBON - 1/4W 100K-J	
R9A77	103P714090	R-CARBON - 1/4W 100K-J	
R9A78	103P711030	R-CARBON - 1/4W 100-J	
R9A79	103P711030	R-CARBON - 1/4W 100-J	
R9A84	103P715050	R-CARBON - 1/4W 330K-J	
R9A85	103P714080	R-CARBON - 1/4W 82K-J	
R9C00	103C188080	R-METAL - 2W 4.7J	
R9C01	103C398020	R-METAL-P - 3W 1.5-K	
R9C20	103C398020	R-METAL-P - 3W 1.5-K	
R9C21	103C398050	R-METAL-P - 3W 2.7-K	
R9D00	**109D036020**	**R-COMPOSITION - 1/2W 4.7M-K**	

CAPACITORS AND TRIMMERS

C-CER-CHIP Capactiors (By Velue)

Value	Part #	Value	Part #
50V 2P-C	154P350040	50V 3300P-K	141P141050
CJ50V 3P-C	154P340040	50V 4700P-K	141P141070
50V 10P-C	154P341010	50V 5600P-J	154P329030
50V 15P-J	154P341050	50V 6800P-K	141P141090
50V 15P-J	154P351060	50V 8200P-K	141P142000
50V 22P-J	154P341090	16V 0.01M-J	172P391030
50V 27P-J	154P352020	50V 0.01M-K	141P142010
50V 33P-J	154P352040	50V 0.01M-Z	141P143080
50V 33P-J	154P342030	50V 0.012M-K	141P142020
50V 39P-J	154P342050	50V 0.015M-K	141P142030
50V 47P-J	154P342070	25V 0.033M-K	141P142070
50V 47P-J	154P352080	25V 0.047M-K	141P142090
50V 56P-J	154P353000	50V 0.047M-Z	141P144010
50V 82P-J	154P343030	16V 0.068M-J	172P392030
50V 100P-J	154P343050	25V 0.068M-K	141P143010
50V 100P-J	154P353060	16V 0.1M-J	172P392050
50V 120P-J	154P343070	16V 0.1M-K	141P143030
50V 150P-J	154P354000	25V 0.1M-Z	141P144020
50V 150P-J	154P343090	50V 0.1M-Z	141P134090
50V 220P-J	154P344030	25V 0.15M-K	141P139050
50V 220P-K	141P140010	16V 0.22M-K	141P139070

[#] Model Legend: (1) WS-55859, (2) WS-55909, (3) WS-65869, (4) WS-65909, (5) WS-73909

Ref #	Part #	Part Name & Description	[#]

Value	Part #	Value	Part #
50V 270P-J	154P344050	50V 2.2M-M 105C	181P526020
50V 330P-J	154P344070	16V 0.47M-K	141P139090
50V 390P-K	141P140040	16V 0.47M-Z	141P144050
50V 470P-J	154P345010	16V 1M-K	141P134070
50V 470P-J	154P325020	16V 1M-Z	141P144060
50V 470P-K	141P140050	16V 1M-Z	141P135070
25V 560P-J	154P345030	16V 1M-Z	141P144060
50V 560P-K	141P140060	50V 1M-M 105C	181P526010
25V 680P-J	154P345050	16V 10M-M	181P502030
25V 1000P-J	154P345090	16V 22M-M	181P502040
50V 1000P-J	172P390010	6.3V 22M-M	181P500010
50V 1000P-K	141P140090	6.3V 22M-M 105C	181P520010
50V 1000P-Z	141P143050	16V 47M-M 105C	181P522060
50V 1500P-K	141P141010	6.3V 47M-M	181P500030
50V 2200P-K	141P141030	6.3V 47M-M 105C	181P520030
50V 2700P-J	154P337040	6.3V 100M-M 105C	181P520040

Conventional Capacitors (By Ref #)

Ref #	Part #	Description	[#]
C1A29	181P352040	C-ELEC - 16V 100M-M	
C1A30	181P352040	C-ELEC - 16V 100M-M	
C1A31	181P352040	C-ELEC - 16V 100M-M	
C1A50	172P262010	C-M-POLY - 50V 0.047M-J	
C1B29	181P352040	C-ELEC - 16V 100M-M	
C1B30	181P352040	C-ELEC - 16V 100M-M	
C1B31	181P352040	C-ELEC - 16V 100M-M	
C1B50	172P262010	C-M-POLY - 50V 0.047M-J	
C2A00	181P352030	C-ELEC - 16V 47M-M	
C2A50	181P352030	C-ELEC - 16V 47M-M	
C2A51	181P352030	C-ELEC - 16V 47M-M	
C2A62	181P352040	C-ELEC - 16V 100M-M	
C2A63	181P352040	C-ELEC - 16V 100M-M	
C2A64	181P352040	C-ELEC - 16V 100M-M	
C2A65	181P352040	C-ELEC - 16V 100M-M	
C2A66	181P352040	C-ELEC - 16V 100M-M	
C2A67	181P352040	C-ELEC - 16V 100M-M	
C2B00	181P352030	C-ELEC - 16V 47M-M	
C2B50	181P352030	C-ELEC - 16V 47M-M	
C2B51	181P352030	C-ELEC - 16V 47M-M	
C2D04	181P352040	C-ELEC - 16V 100M-M	
C2D17	181P352010	C-ELEC - 16V 22M-M	
C2D19	181P352030	C-ELEC - 16V 47M-M	
C2E03	181P352030	C-ELEC - 16V 47M-M	
C2E24	181P352030	C-ELEC - 16V 47M-M	
C2F30	181P352040	C-ELEC - 16V 100M-M	
C2F40	181P352040	C-ELEC - 16V 100M-M	
C2H60	181P352030	C-ELEC - 16V 47M-M	
C2H63	181P352030	C-ELEC - 16V 47M-M	
C2K24	181P124040	C-ELEC-NP - 50V 10M-M	
C2K30	181P124040	C-ELEC-NP - 50V 10M-M	
C2M20	181P352080	C-ELEC - 16V 1000M-M	
C2M22	181P352030	C-ELEC - 16V 47M-M	
C2M23	181P352030	C-ELEC - 16V 47M-M	
C2V07	181P352050	C-ELEC - 16V 220M-M	
C2V72	181P352050	C-ELEC - 16V 220M-M	
C2W04	181P352050	C-ELEC - 16V 220M-M	
C2W05	181P352030	C-ELEC - 16V 47M-M	
C2W09	181P352030	C-ELEC - 16V 47M-M	
C2W14	181P352030	C-ELEC - 16V 47M-M	
C2X00	181P352040	C-ELEC - 16V 100M-M	
C2Y01	181P352030	C-ELEC - 16V 47M-M	
C2Y11	181P352030	C-ELEC - 16V 47M-M	
C2Y30	181P352030	C-ELEC - 16V 47M-M	
C3A11	181P352040	C-ELEC - 16V 100M-M	
C3A15	181P124020	C-ELEC-NP - 50V 4.7M-M NP	
C3A27	181P352060	C-ELEC - 16V 330M-M	
C3A30	181P352040	C-ELEC - 16V 100M-M	
C3A38	181P124020	C-ELEC-NP - 50V 4.7M-M NP	
C3E09	172P262050	C-M-POLY - 50V 0.1M-J	
C3E11	172P262050	C-M-POLY - 50V 0.1M-J	
C3E12	172P262050	C-M-POLY - 50V 0.1M-J	
C3E14	172P262050	C-M-POLY - 50V 0.1M-J	
C4A04	172P262050	C-M-POLY - 50V 0.1M-J	
C4A05	172P262050	C-M-POLY - 50V 0.1M-J	
C4A10	181P352030	C-ELEC - 16V 47M-M	
C4A14	181P352030	C-ELEC - 16V 47M-M	
C4A34	181P352030	C-ELEC - 16V 47M-M	
C4A35	172P262090	C-M-POLY - 50V 0.22M-J	
C4B01	172P262050	C-M-POLY - 50V 0.1M-J	
C4B02	181P358000	C-ELEC - 35V 1000M-M	
C4B13	172P262020	C-M-POLY - 50V 0.056M-J	
C5A03	**142P020050**	**C-CER - B50V 470P-K**	
C5A13	181P352040	C-ELEC - 16V 100M-M	
C5A21	172P262050	C-M-POLY - 50V 0.1M-J	
C5A31	172P580050	C-M-PLA-PP - 1800V 1500P-J	
C5A32	172P581030	C-M-PLA-PP - 1800V 3300P-J	
C5A33	172P581030	C-M-PLA-PP - 1800V 3300P-J	
C5A34	154P262000	C-CER - R2KV 220P-K	
C5A35	142P011070	C-CER - B500V 2200P-K	
C5A39	142P011000	C-CER - B500V 560P-K	
C5A40	142P011000	C-CER - B500V 560P-K	
C5A42	181P352030	C-ELEC - 16V 47M-M	
C5A51	**154P260010**	**C-CER - R1KV 220P-K**	
C5A52	**172P460010**	**C-M-PLA-PP - 2000V 1000P-J**	
C5A53	**172P460030**	**C-M-PLA-PP - 2000V 1200P-J**	
C5A54	185D120010	C-ELEC - H160V 330M-M 105C	
C5A55	172P088060	C-PLAST-PP - 630V 6800P-J	
C5A60	**172P262050**	**C-M-POLY - 50V 0.1M-J**	
C5A64	**181P352010**	**C-ELEC - 16V 22M-M**	
C5A70	**172P384030**	**C-M-POLY - 100V 3.3M-K**	
C5A71	**172P262060**	**C-M-POLY - 50V 0.12M-J**	
C5H01	181P352060	C-ELEC - 16V 330M-M	
C5H16	172P186030	C-PLAST-PP - 200V 0.01M-K	
C5H20	181P352040	C-ELEC - 16V 100M-M	
C5H24	181P192060	C-ELEC - 200V 22M-M	
C5K03	181P352040	C-ELEC - 16V 100M-M	
C5K12	181P352040	C-ELEC - 16V 100M-M	
C5K14	181P352030	C-ELEC - 16V 47M-M	
C6B02	181P195050	C-ELEC - 350V 1M-M	
C6B05	181P352030	C-ELEC - 16V 47M-M	
C6B16	154P260050	C-CER - R1KV 1000P-K	135
C6G02	181P195050	C-ELEC - 350V 1M-M	
C6G05	181P352030	C-ELEC - 16V 47M-M	
C6G16	154P260050	C-CER - R1KV 1000P-K	135
C6R02	181P195050	C-ELEC - 350V 1M-M	
C6R05	181P352030	C-ELEC - 16V 47M-M	
C7A31	181P352030	C-ELEC - 16V 47M-M	
C7A99	181P352030	C-ELEC - 16V 47M-M	
C7B76	181P352030	C-ELEC - 16V 47M-M	

[#] Model Legend: (1) WS-55859, (2) WS-55909, (3) WS-65869, (4) WS-65909, (5) WS-73909

Ref #	Part #	Part Name & Description	[#]
C7C00	181P352040	C-ELEC - 16V 100M-M	
C7C31	181P352050	C-ELEC - 16V 220M-M	
C7K01	181P352030	C-ELEC - 16V 47M-M	
C7K23	181P352030	C-ELEC - 16V 47M-M	
C7K25	172P262050	C-M-POLY - 50V 0.1M-J	
C7K26	172P262050	C-M-POLY - 50V 0.1M-J	
C7L22	172P262050	C-M-POLY - 50V 0.1M-J	
C8C03	181P184010	C-ELEC - 50V 1000M-M 105C	
C8C05	181P184010	C-ELEC - 50V 1000M-M 105C	
C8C43	142P020080	C-CER - B50V 820P-K	
C8C44	142P020080	C-CER - B50V 820P-K	
C8C45	142P020080	C-CER - B50V 820P-K	
C8C46	142P020080	C-CER - B50V 820P-K	
C8C47	142P020080	C-CER - B50V 820P-K	
C8C48	142P020080	C-CER - B50V 820P-K	
C8D16	181P352030	C-ELEC - 16V 47M-M	
C8D19	181P352030	C-ELEC - 16V 47M-M	
C8D20	181P352030	C-ELEC - 16V 47M-M	
C8D21	181P352030	C-ELEC - 16V 47M-M	
C8D22	181P352030	C-ELEC - 16V 47M-M	
C8D30	181P352030	C-ELEC - 16V 47M-M	
C8D31	181P352030	C-ELEC - 16V 47M-M	
C8D33	181P352030	C-ELEC - 16V 47M-M	
C8D35	172P262040	C-M-POLY - 50V 0.082M-J	
C8D36	181P352030	C-ELEC - 16V 47M-M	
C8D39	181P352030	C-ELEC - 16V 47M-M	
C8D40	181P352030	C-ELEC - 16V 47M-M	
C8E01	181P352030	C-ELEC - 16V 47M-M	
C8E03	181P352030	C-ELEC - 16V 47M-M	
C8E05	181P352030	C-ELEC - 16V 47M-M	
C8E07	181P352030	C-ELEC - 16V 47M-M	
C8E09	181P352030	C-ELEC - 16V 47M-M	
C8E12	181P352030	C-ELEC - 16V 47M-M	
C8E14	181P352030	C-ELEC - 16V 47M-M	
C8E16	181P352030	C-ELEC - 16V 47M-M	
C8G00	181P352030	C-ELEC - 16V 47M-M	
C8G01	181P352030	C-ELEC - 16V 47M-M	
C8G03	181P352020	C-ELEC - 16V 33M-M	
C8G05	181P352030	C-ELEC - 16V 47M-M	
C8G06	181P352030	C-ELEC - 16V 47M-M	
C8G09	181P352030	C-ELEC - 16V 47M-M	
C8G55	181P352030	C-ELEC - 16V 47M-M	
C9A05	**189P185070**	**C-CER - 250VAC 1000P-M**	
C9A06	**189P185070**	**C-CER - 250VAC 1000P-M**	
C9A07	**189P153040**	**C-M-POLY - 250VAC 0.1M-M**	
C9A08	**189P185090**	**C-CER - 250VAC 2200P-M**	
C9A09	**189P185090**	**C-CER - 250VAC 2200P-M**	
C9A10	**189P185090**	**C-CER - 250VAC 2200P-M**	
C9A11	**189P185090**	**C-CER - 250VAC 2200P-M**	
C9A12	185D122050	C-ELEC - H200V 1000M-M 105C	
C9A13	**189P152070**	**C-M-POLY - 250VAC 0.01M-M**	
C9A14	**189P152070**	**C-M-POLY - 250VAC 0.01M-M**	
C9A15	189P185090	C-CER - 250VAC 2200P-M	
C9A20	**189P152070**	**C-M-POLY - 250VAC 0.01M-M**	
C9A22	154P260050	C-CER - R1KV 1000P-K	
C9A24	142P020050	C-CER - B50V 470P-K	
C9A35	181P352040	C-ELEC - 16V 100M-M	
C9A40	181P352040	C-ELEC - 16V 100M-M	
C9A42	181P352040	C-ELEC - 16V 100M-M	
C9A50	**142P020050**	**C-CER - B50V 470P-K**	

Ref #	Part #	Part Name & Description	[#]
C9A53	185D122050	C-ELEC - H200V 1000M-M 105C	
C9A54	154P260080	C-CER - R1KV 3300P-K	
C9A56	181P186000	C-ELEC - 50V 100M-M 105C	
C9A58	185D163020	C-ELEC - H50V 4700M-M 105C	
C9A59	185D122050	C-ELEC - H200V 1000M-M 105C	
C9A62	181P195080	C-ELEC - 350V 47M-M/Q	2&4
C9A63	185D121020	C-ELEC - H180V 470M-M 105C	
C9A69	181P358030	C-ELEC - 35V 4700M-M	
C9A73	181P358030	C-ELEC - 35V 4700M-M	
C9B01	181P182030	C-ELEC - 16V 1000M-M 105C	
C9B02	181P182030	C-ELEC - 16V 1000M-M 105C	
C9B03	181P182030	C-ELEC - 16V 1000M-M 105C	
C9B13	181P182030	C-ELEC - 16V 1000M-M 105C	
C9B14	181P182030	C-ELEC - 16V 1000M-M 105C	
C9B17	181P182030	C-ELEC - 16V 1000M-M 105C	
C9B18	181P182030	C-ELEC - 16V 1000M-M 105C	
C9C00	181P350010	C-ELEC - 16V 4700M-M	
C9C02	181P352030	C-ELEC - 16V 47M-M	
C9C05	181P352030	C-ELEC - 16V 47M-M	
C9C10	181P352030	C-ELEC - 16V 47M-M	
C9C12	181P352030	C-ELEC - 16V 47M-M	
C9C20	181P352030	C-ELEC - 16V 47M-M	
C9C24	181P352030	C-ELEC - 16V 47M-M	
C9C26	181P352030	C-ELEC - 16V 47M-M	
C9C40	181P352030	C-ELEC - 16V 47M-M	
C9C42	181P352030	C-ELEC - 16V 47M-M	
C9C52	181P352030	C-ELEC - 16V 47M-M	
C9D00	**189P153040**	**C-M-POLY - 250VAC 0.1M-M**	
C9D01	**189P153040**	**C-M-POLY - 250VAC 0.1M-M**	
CF2E00	299P128010	CERAMIC-OSC - CSB500F2	
CF2H01	299P128010	CERAMIC-OSC - CSB500F2	
CF3A01	299P208010	CERAMIC-OSC - C5B503F58	
		SWITCHES	
S7L20	432P089010	SW-KEY-BOARD - PUSH SWITCH	
S7L21	432P089010	SW-KEY-BOARD - PUSH SWITCH	
S7L22	432P089010	SW-KEY-BOARD - PUSH SWITCH	
S7L23	432P089010	SW-KEY-BOARD - PUSH SWITCH	
S7L24	432P089010	SW-KEY-BOARD - PUSH SWITCH	
S7L25	432P089010	SW-KEY-BOARD - PUSH SWITCH	
S7L26	432P089010	SW-KEY-BOARD - PUSH SWITCH	
S7L27	432P089010	SW-KEY-BOARD - PUSH SWITCH	
S7L28	432P089010	SW-KEY-BOARD - PUSH SWITCH	
S7L29	432P089010	SW-KEY-BOARD - PUSH SWITCH	
		MISCELLANEOUS	
	242D483020	IR-MOUSE	
	246C351030	AC-POWER-CORD	
	299P254010	IR-EMITTER, 4-HEAD - T-IR-0	
	305P702020	RF-SW - YAA41-0126G	
	330P276010	**DEFL-YOKE**	
	338P046030	SVM COIL - G&B	
	338P051010	SVM COIL - GREEN	2-5
	411D023010	CORE-FERRITE	
	411D024020	CORE-FERRITE - ZCAT2132-1130	
	411D033010	CORE-FERRITE	
	411D044010	CORE-FERRITE	
	449C141030	**SOCKET-CRT**	
	453B035010	**CAP-ANODE - SHORT - RED**	**1-4**

[#] Model Legend: (1) WS-55859, (2) WS-55909, (3) WS-65869, (4) WS-65909, (5) WS-73909

Ref #	Part #	Part Name & Description	[#]
	453B035020	**CAP-ANODE - LONG - G&B**	**1-4**
	453B035030	**CAP-ANODE - SHORT - RED**	**5**
	453B035040	**CAP-ANODE - LONG - G&B**	**5**
	453C021030	**LEAD-ANODE - FBT-HV**	
	480P053010	SPEAKER	1
	480P057010	SPEAKER - LARGE	245
	480P058010	SPEAKER - SMALL	245
	480P063010	SPEAKER	3
	490P174070	LENS - RED	1&3
	490P174080	LENS - GREEN	1&3
	490P174090	LENS - BLUE	1-4
	490P195010	LENS - ALL COLORS	5
	490P212010	LEN-BARREL-RED	2&4
	490P212020	LEN-BARREL-GREEN	2&4
	589C062010	CASTER	
	597D843010	STIFFENER-MIRROR - 3/4"X3/4" TUBING	3&4
	622B009010	TRAY, COOLANT - PS 94V-0	1-4
	622C067010	CRT-TRAY	5
	622D928010	TREE-LOK-PANEL	245
	642C340010	BOARD-MIRROR	3&4
	642C352010	CLIP-MIRROR	1&2
	669D514070	SCREW-MIRROR BOARD	134
	767C031010	MIRROR - 73"	5
	767D048090	MIRROR - 65"	3&4
	767D055040	MIRROR - 55"	1&2
	920P016010	**HV-BLOCK - MSC102**	
	955C230001	ASSY-DM	
AG5K00	224D019040	AIR-GAP - 2.0+-0.5KV S.LEAD	
AG6B01	224D019090	AIR-GAP - 1.5+-0.5KV S.LEAD	
AG6G01	224D019090	AIR-GAP - 1.5+-0.5KV S.LEAD	
AG6R01	224D019090	AIR-GAP - 1.5+-0.5KV S.LEAD	
F5A00	283P043060	FUSE - LF251 3A	
F5A01	**283P043060**	**FUSE - LF251 3A**	
F9A01	**283P044020**	**FUSE - LF251 10A**	
F9A02	**283P044020**	**FUSE - LF251 10A**	
F9A03	**283P043090**	**FUSE - LF251 5A**	
F9A04	**283P043090**	**FUSE - LF251 5A**	
F9A05	**283P043090**	**FUSE - LF251 5A**	
F9A06	**283P043090**	**FUSE - LF251 5A**	
F9D00	**283D131040**	**FUSE - S10A 125A**	
K9A50	**287P049080**	**RELAY-POWER - DG12D1-0(M)**	
PC9A20	**268P058020**	**PHOTO-COUPLER - ON3131-R/ON3161-R**	
PC9A21	**268P058020**	**PHOTO-COUPLER - ON3131-R/ON3161-R**	
PC9A50	**268P058020**	**PHOTO-COUPLER - ON3131-R/ON3161-R**	
PC9A51	**268P058020**	**PHOTO-COUPLER - ON3131-R/ON3161-R**	
PJ2J00	440C386010	PIN-JACK-BOARD	135
PJ2J00	440C386030	PIN-JACK-BOARD-6P-2S	245
PJ2J01	440C386010	PIN-JACK-BOARD	135
PJ2J01	440C386030	PIN-JACK-BOARD-6P-2S	245
PJ2J02	440C402010	PIN-JACK-BOARD-5P-S	135
PJ2J02	440C402020	PIN-JACK-BOARD-5P-S	245
PJ2J03	440C385010	PIN-JACK-BOARD-6P	135
PJ2J03	440C385030	PIN-JACK-BOARD-6P	245
PJ2J04	440C261070	PIN-JACK-BOARD-2P	135
PJ2J04	440C383040	PIN-JACK-BOARD-2P	245
PJ2J05	440C261050	PIN-JACK-BOARD-2P	135
PJ2J05	440C383020	PIN-JACK-BOARD-2P	245
PJ2J07	440C261070	PIN-JACK-BOARD-2P	135
PJ2J07	440C383040	PIN-JACK-BOARD-2P	245
PJ2J08	440C385020	PIN-JACK-BOARD-6P	135
PJ2J08	440C385040	PIN-JACK-B0ARD-6P	245
PJ2J09	440C261050	PIN-JACK-BOARD-2P	135
PJ2J09	440C383020	PIN-JACK-BOARD-2P	245
PJ2J11	440C231010	JACK-3PIN - FRONT A/V INPUT	1&3
PJ2J11	440C384010	PIN-JACK-BOARD-3P-1S	245
PJ7C01	451C129010	JACK-MINI - AV NET/IR BLAST	
PJ7C02	451C129010	JACK-MINI - AV NET/IR BLAST	
TU1A01	**295P500010**	**TUNER-RF - ENG26515G**	
TU1B01	**295P500010**	**TUNER-RF - ENG26515G**	
X2A20	285P029030	QUARTZ-CRYST - HC-49 MHZ	
X2B20	285P029030	QUARTZ-CRYST - HC-49 MHZ	
X2C31	285P374050	QUARTS-CRYST - 20.000MHZ	
X2E26	285P374020	QUARTZ-CRYST - 3.579545MHZ	
X2H26	285P066010	QUARTZ-CRYST - 3.579545MHZ	
X7A13	285P374040	QUARTZ-CRYST - 10.000MHZ	
X7H00	285P335040	QUARTZ-CRYST - 60.000MHZ	
X7H01	285P335050	QUARTZ-CRYST - 80.000MHZ	
Z5900	283P128050	FUSE-CHIP - AC125V/100V 4A	
Z5901	283P128050	FUSE-CHIP - AC125V/100V 4A	
Z7K01	939P617010	UNIT-PREAMP - GP1U283Q	

PRINTED CIRCUIT BOARDS

930B866010	ASSY-PWB-MAIN	1-4
930B866011	ASSY-PWB-MAIN	5
930B879001	ASSY-PWB-POWER	
930B880001	ASSY-PWB-SIGNAL	1&3
930B880002	ASSY-PWB-SIGNAL	245
935C965001	ASSY-PWB-CRT	
935C966001	ASSY-PWB-2HDW	
935C967001	ASSY-PWB-TERMINAL	135
935C967002	ASSY-PWB-TERMINAL	245
935C974001	ASSY-PWB-DEMOD-B	
935C978001	ASSY-PWB-E2P	
935C979002	ASSY-PWB-DEMOD	
935C986001	ASSY-PWB-DM POWER	
935D521005	ASSY-PWB-DBF	
935D581001	ASSY-PWB-PREAMP	
935D583001	ASSY-PWB-JUNGLE	
935D584001	ASSY-PWB-SVM	
935D585001-55	ASSY-PWB-CONV-GENE-55	1&2
935D585001-65	ASSY-PWB-CONV-GENE-65	3&4
935D585001-73	ASSY-PWB-CONV-GENE-73	5
935D586001	ASSY-PWB-3DYC/MD	
935D587001	ASSY-PWB-CONTROL 2	
935D588001	ASSY-PWB-FRONT	1&3
935D588002	ASSY-PWB-FRONT	245
935D605001	ASSY-PWB-CROSS OVER	245

COSMETIC PARTS

669D514080	SCREW	2&5
702A398020	COVER-CONTROL	3
702A399020	TERMINAL-BOARD	
702A400020	DM TERMINAL-BOARD	
702A401010	COVER CONTROL	245
702A403010	CONTROL PANEL	1
703B031020	DOOR - FRONT A/V IN COVER	1
761A159040	GRILLE-SP - 55"	1
761A174030	GRILLE-SP-LEFT - 55”	2
761A174040	GRILLE -SP-RIGHT - 55”	2

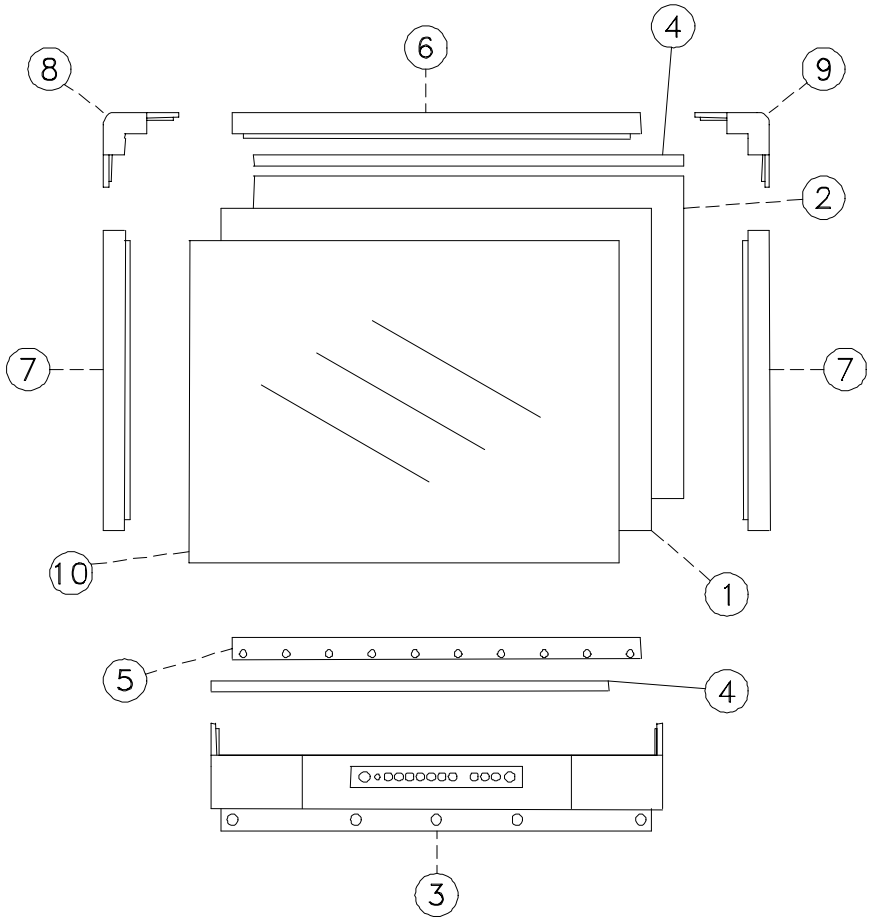
[#] Model Legend: (1) WS-55859, (2) WS-55909, (3) WS-65869, (4) WS-65909, (5) WS-73909

Ref #	Part #	Part Name & Description	[#]
	752A001020	UNIT-FRONT-TOP	2
	762B358040	UNIT-FRONT	2
	761A173030	GRILLE-SPEAKER	3
	752A003020	UNIT-FRONT-TOP	4&5
	761A175010	GRILLE-SP-LEFT - 65"	4
	761A175020	GRILLE-SP-RIGHT - 65"	4
	762B358020	UNIT-FRONT	4
	761A186010	GRILLE-SP-LEFT - 73"	5
	761A186020	GRILLE-SP-RIGHT - 73"	5
	762B358030	UNIT-FRONT	5
	803B878010	CUSHION	245
		ACCESSORIES	
	290P106010	REMOTE CONTROL	
	I/G V19	NET COMMAND GUIDE - BOOK	
	852B087010	NET COMMAND CONFIGURATION FOLD	1235
	853B291010	REGISTRATION-CARD	
	I/SEP GUIDE65869	CABINET SEPARATION GUIDE	3

Ref #	Part #	Part Name & Description	[#]

[#] Model Legend: (1) WS-55859, (2) WS-55909, (3) WS-65869, (4) WS-65909, (5) WS-73909

Ref #	Part #	Part Name & Description	[#]
SCREEN ASSEMBLY PARTS (*Figure 1*)			
WS-55859 ***(Figure 1)***			
(1)	491P103010	SCREEN-LENTICULAR	
(2)	491P104010	LENS-FRESNEL	
(3)	702A403010	CONTROL PANEL	
(4)	622C060040	CLIP-SCREEN-TOP/BOT	
(5)	622C063040	HOLDER-SCREEN-BOT	
(6)	701B400080	FRAME-SCREEN-TOP - 60"	
(7)	701B417010	FRAME-SCREEN-SIDE - 55"	
(8)	702A388030	CAP-CORNER-LEFT	
(9)	702A388040	CAP-CORNER-RIGHT	
(10)	760D627060	DIAMOND SHIELD	



WS-55859

Figure 1: Screen Assembly Parts

[#] Model Legend: (1) WS-55859, (2) WS-55909, (3) WS-65869, (4) WS-65909, (5) WS-73909

SCREEN ASSEMBLY PARTS *(Figure 2)*

WS-55909 ***(Figure 2)***

Ref #	Part #	Part Name & Description	[#]
(1)	491P103010	SCREEN-LENTICULAR	
(2)	491P104010	LENS-FRESNEL	
(3)	622D746080	CLIP-SCREEN-SIDES	
(4)	711C029040	FRAME-SCREEN-TOP - 55"	
(5)	711C029050	FRAME-SCREEN-SIDES - 55"	
(6)	711C029060	FRAME-SCREEN-BOTTOM - 55"	
(7)	768C065010	CAP-CORNER	
(8)	760D635010	DIAMOND SHIELD	

WS-65869 ***(Figure 2)***

Ref #	Part #	Part Name & Description	[#]
(1)	491P105010	SCREEN-LENTICULAR	
(2)	491P106010	LENS-FRESNEL	
(9)	622C071020	CLIP-SCREEN-TOP/BOT	
(4) (6)	701B429020	SCREEN-FRAME-TOP/BOT - 65"	
(5)	701B430020	SCREEN-FRAME SIDES - 65"	
(7)	702A396010	CAP-CORNER	
(8)	760D627070	DIAMOND SHIELD	
	802B816010	SCREEN PAD	

WS-65909 ***(Figure 2)***

Ref #	Part #	Part Name & Description	[#]
(1)	491P105010	SCREEN-LENTICULAR	
(2)	491P106010	LENS-FRESNEL	
(3)	622D746020	CLIP-SCREEN-SIDES	
(4)	711C026040	FRAME-SCREEN-TOP - 65"	
(5)	711C026050	FRAME-SCREEN-SIDES - 65"	
(6)	711C026060	FRAME-SCREEN-BOTTOM - 65"	
(7)	768C065010	CAP-CORNER	
(8)	760D635020	DIAMOND SHIELD	
	802B816010	SCREEN PAD	

WS-73909 ***(Figure 2)***

Ref #	Part #	Part Name & Description	[#]
(1)	491P085020	SCREEN-LENTICULAR	
(2)	491P086020	LENS-FRESNEL	
(3)	622D746010	CLIP-SCREEN-SIDES	
(4)	711C029070	FRAME-SCREEN-TOP - 73"	
(5)	711C029080	FRAME-SCREEN-SIDES - 73"	
(6)	711C029090	FRAME-SCREEN-BOTTOM - 73"	
(7)	768C065010	CAP-CORNER	
(8)	760D635030	AR DIAMOND SHIELD	

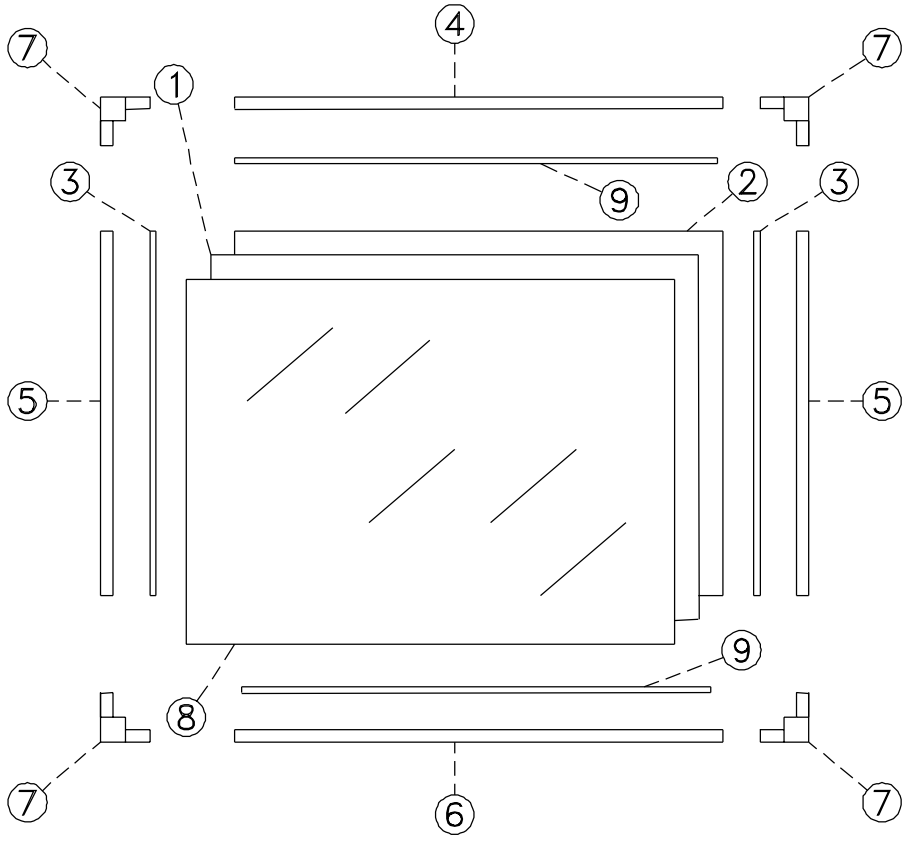
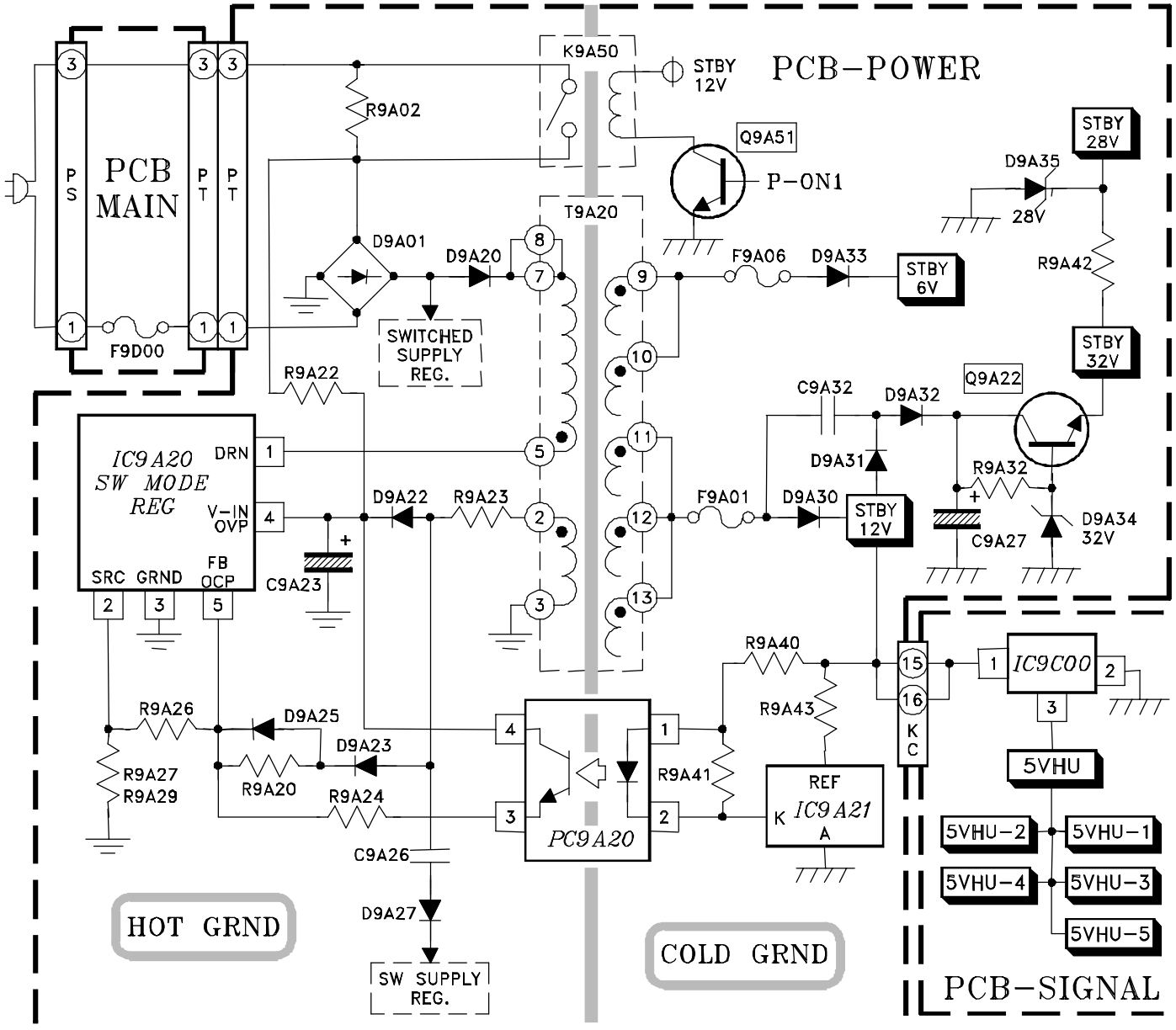
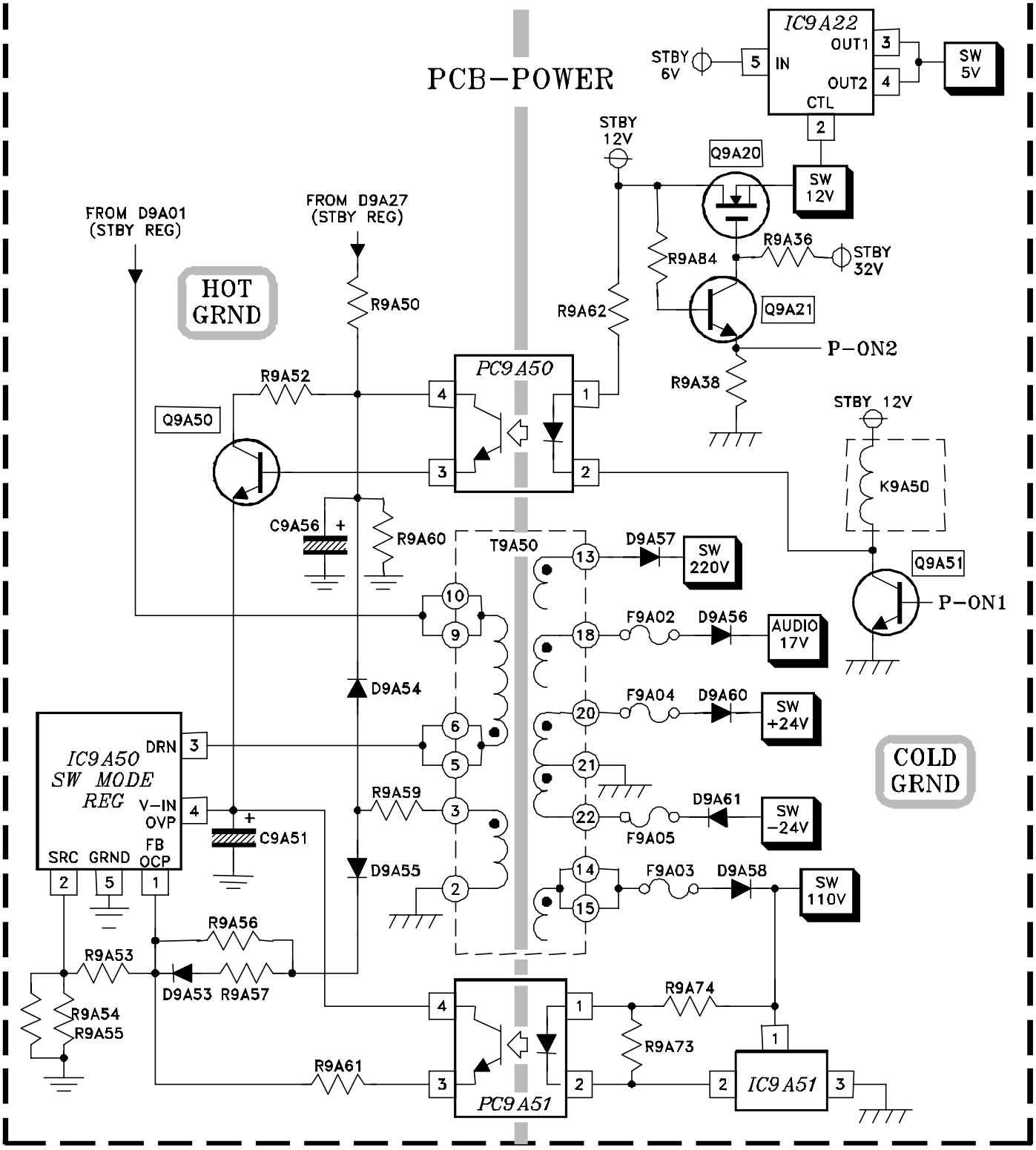


Figure 2: Screen Assembly Parts

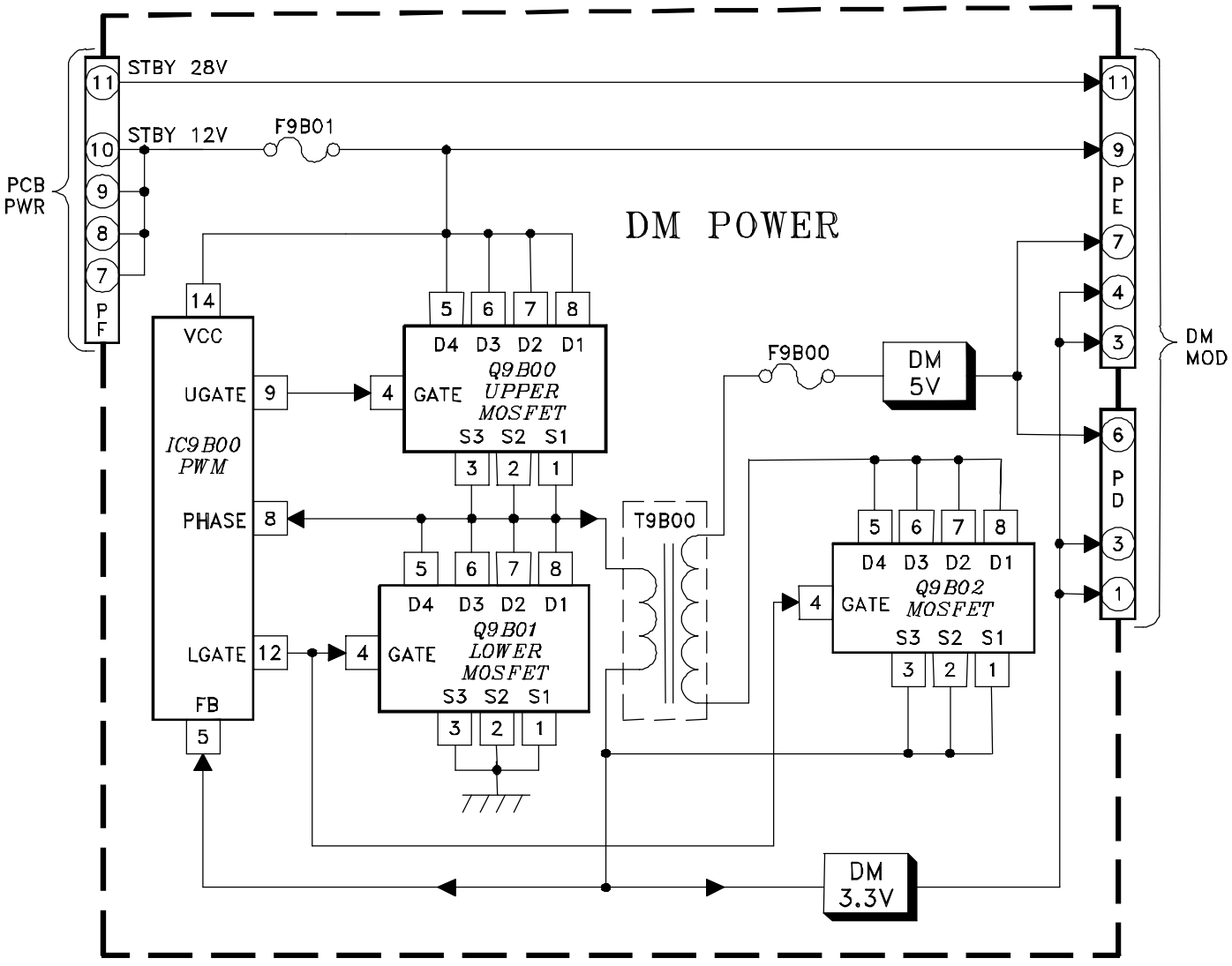
STANDBY SUPPLIES REGULATOR



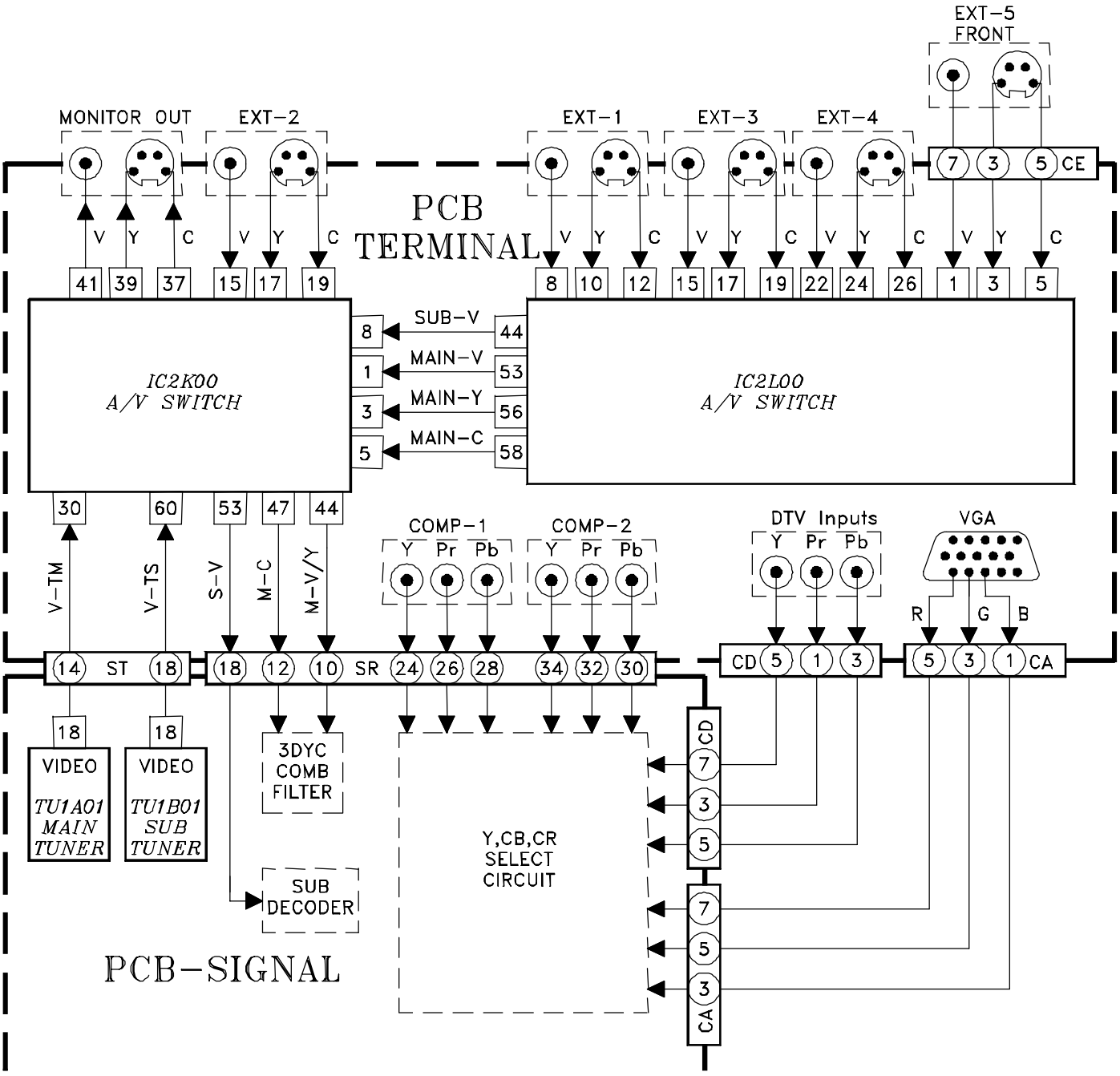
SWITCHED SUPPLIES REGULATOR



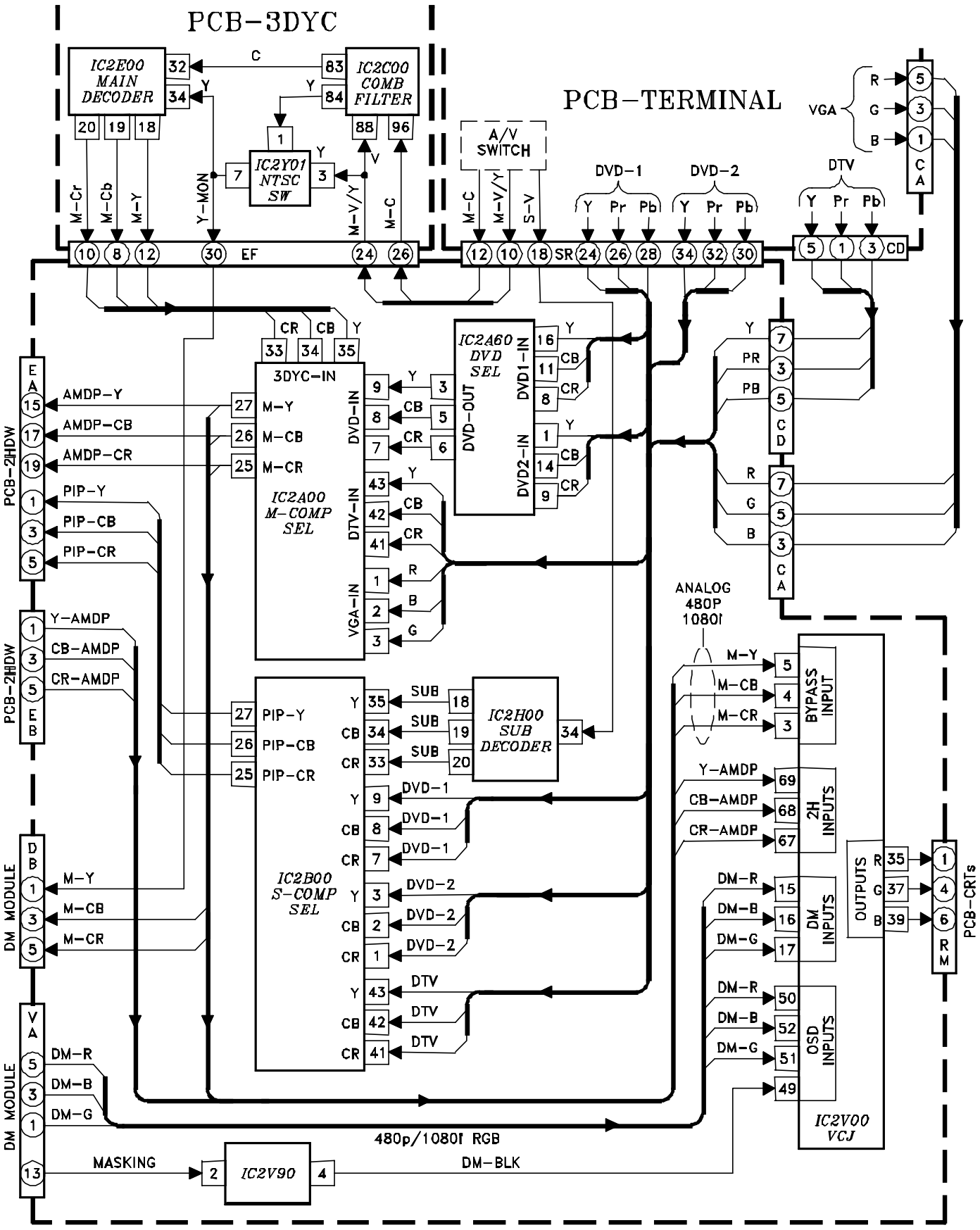
DM POWER SUPPLY

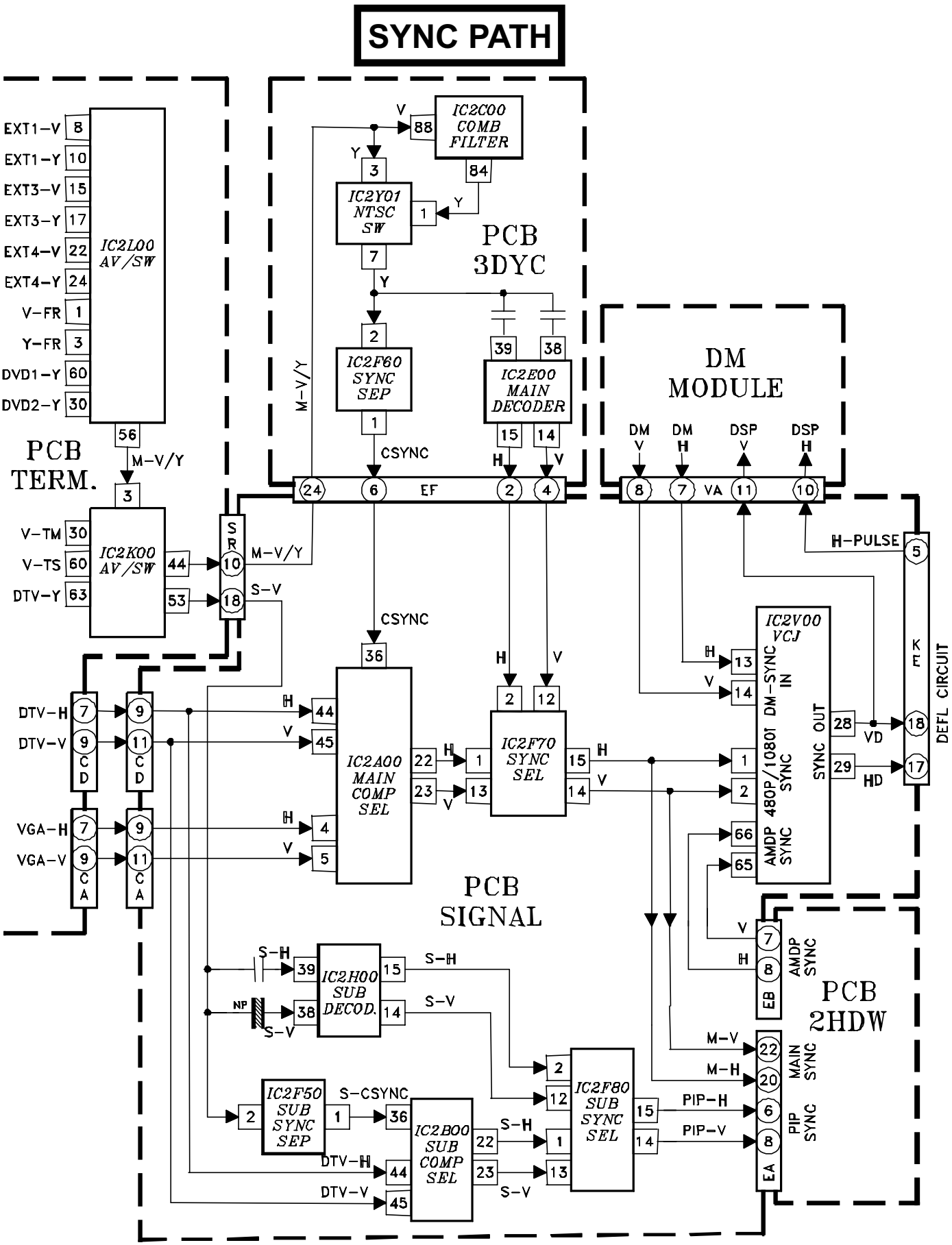


VIDEO/COLOR A/V SWITCH CIRCUIT

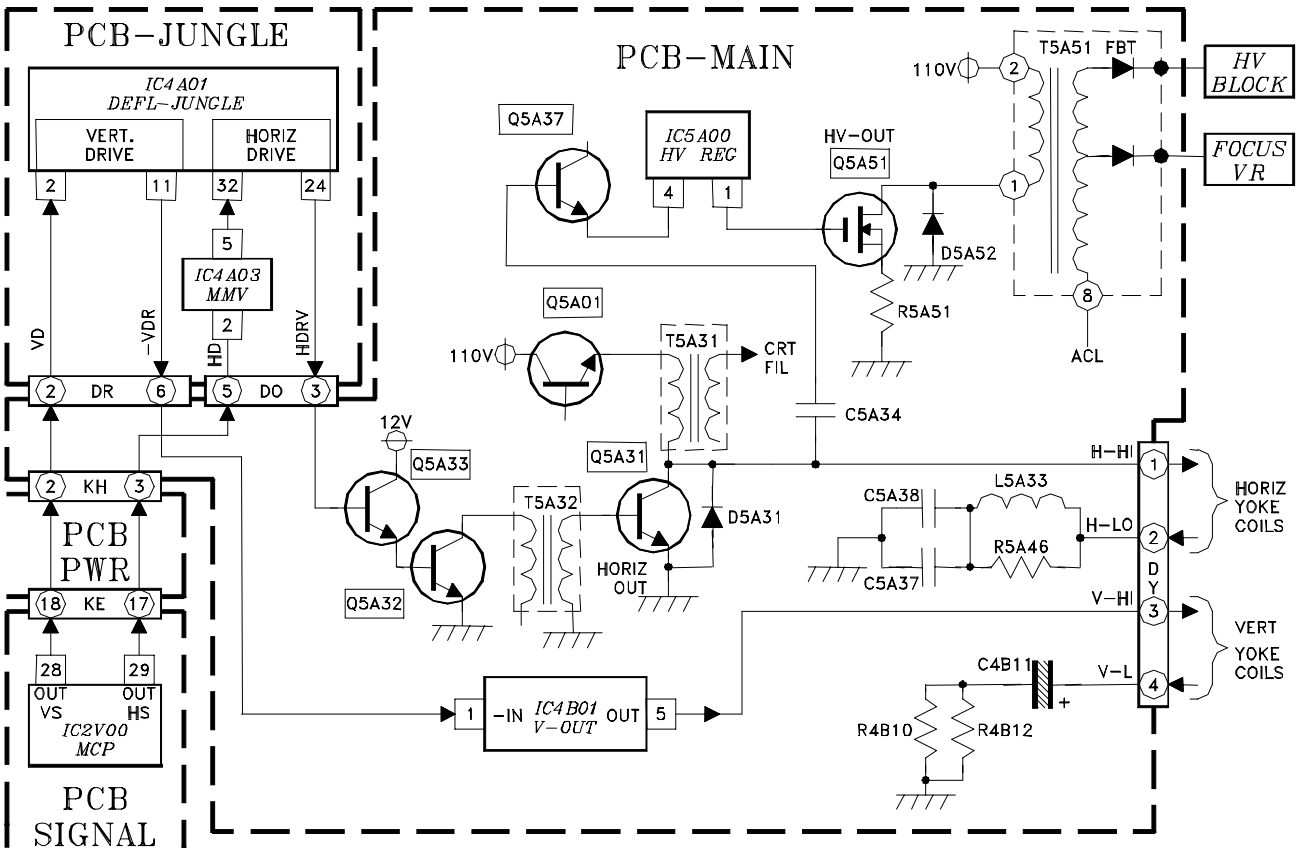


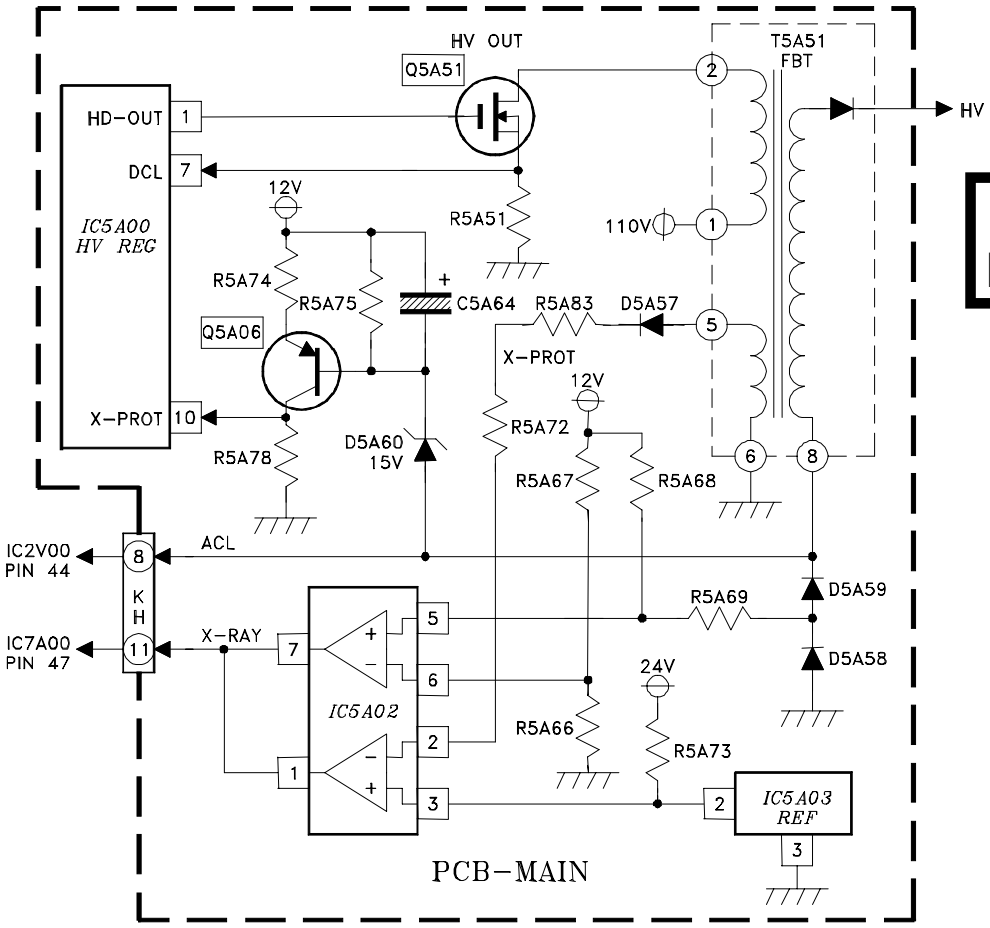
PCB-SIGNAL Y/C PATH




SYNC PATH
EXT1-V
EXT1-Y
EXT3-V
EXT3-Y
EXT4-V
EXT4-Y
V-FR
Y-FR
DVD1-Y
DVD2-Y
IC2L00 AV/SW
PCB TERM.
M-V/Y
V-TM
V-TS
DTV-Y
IC2K00 AV/SW
S-V
IC2C00 COMB FILTER
IC2Y01 NTSC SW
PCB 3DYC
IC2F60 SYNC SEP
IC2E00 MAIN DECODER
CSYNC
DM MODULE
DM V
DM H
DSP V
DSP H
EF
VA
H-PULSE
DEFL CIRCUIT
IC2V00 VCJ
DM-SYNC IN
480P/1080I SYNC
AMDP SYNC
SYNC OUT
VD
HD
DTV-H
DTV-V
VGA-H
VGA-V
IC2A00 MAIN COMP SEL
IC2F70 SYNC SEL
PCB SIGNAL
S-H
NP
IC2H00 SUB DECOD.
IC2F50 SUB SYNC SEP
S-CSYNC
IC2B00 SUB COMP SEL
IC2F80 SUB SYNC SEL
PIP-H
PIP-V
PCB 2HDW
MAIN SYNC
PIP SYNC

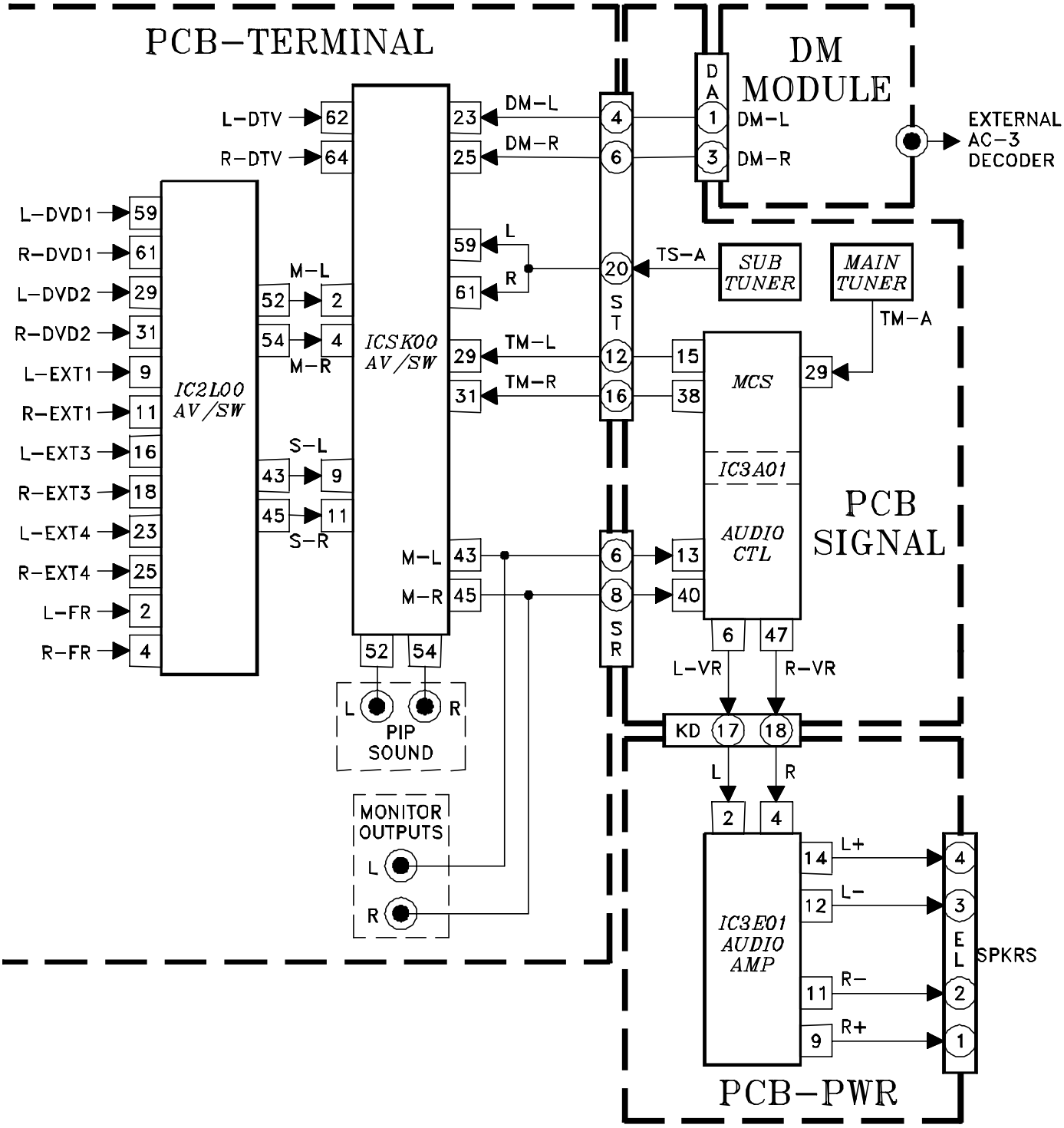
DEFLECTION CIRCUIT



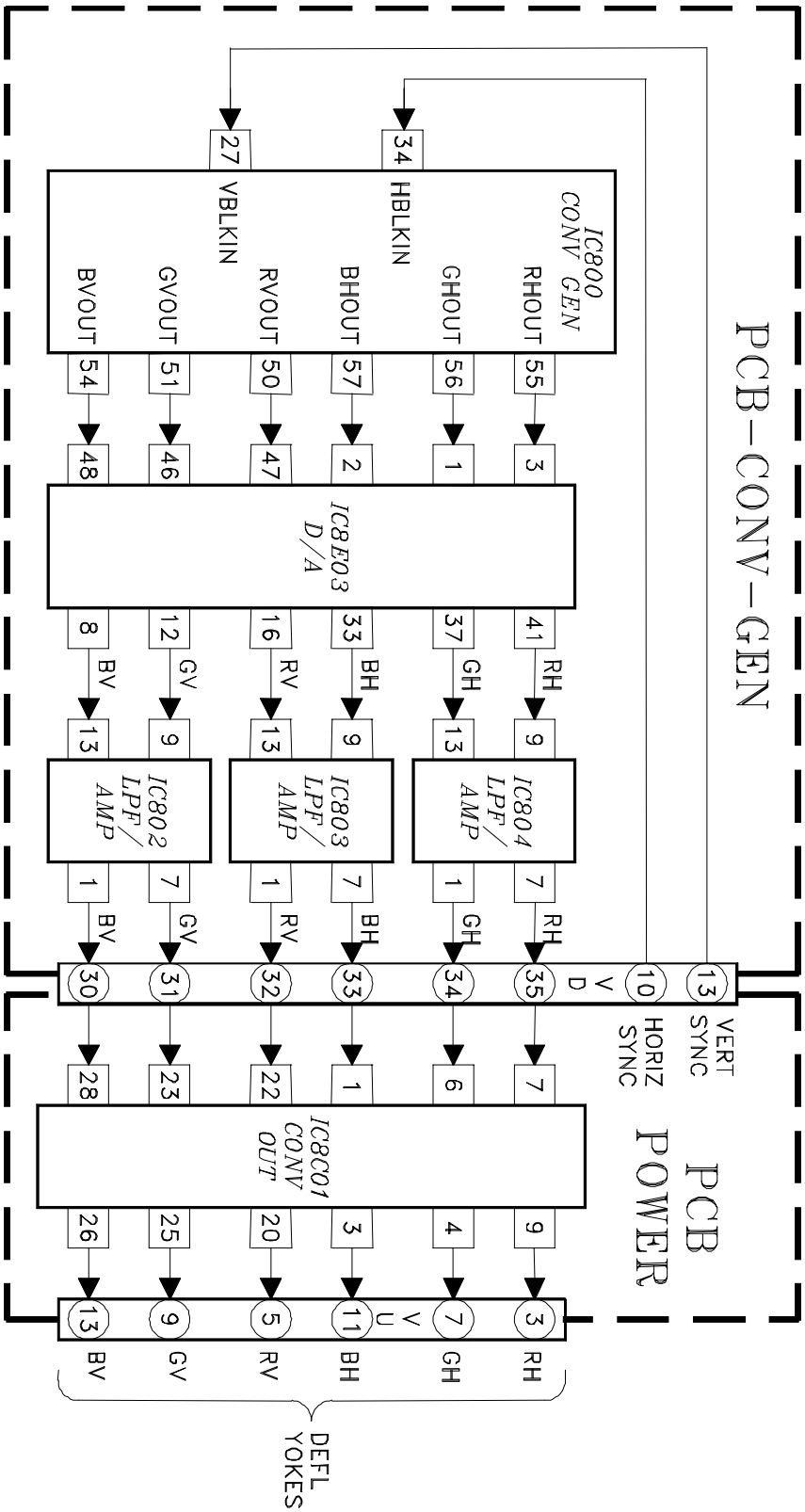


X-RAY PROTECT

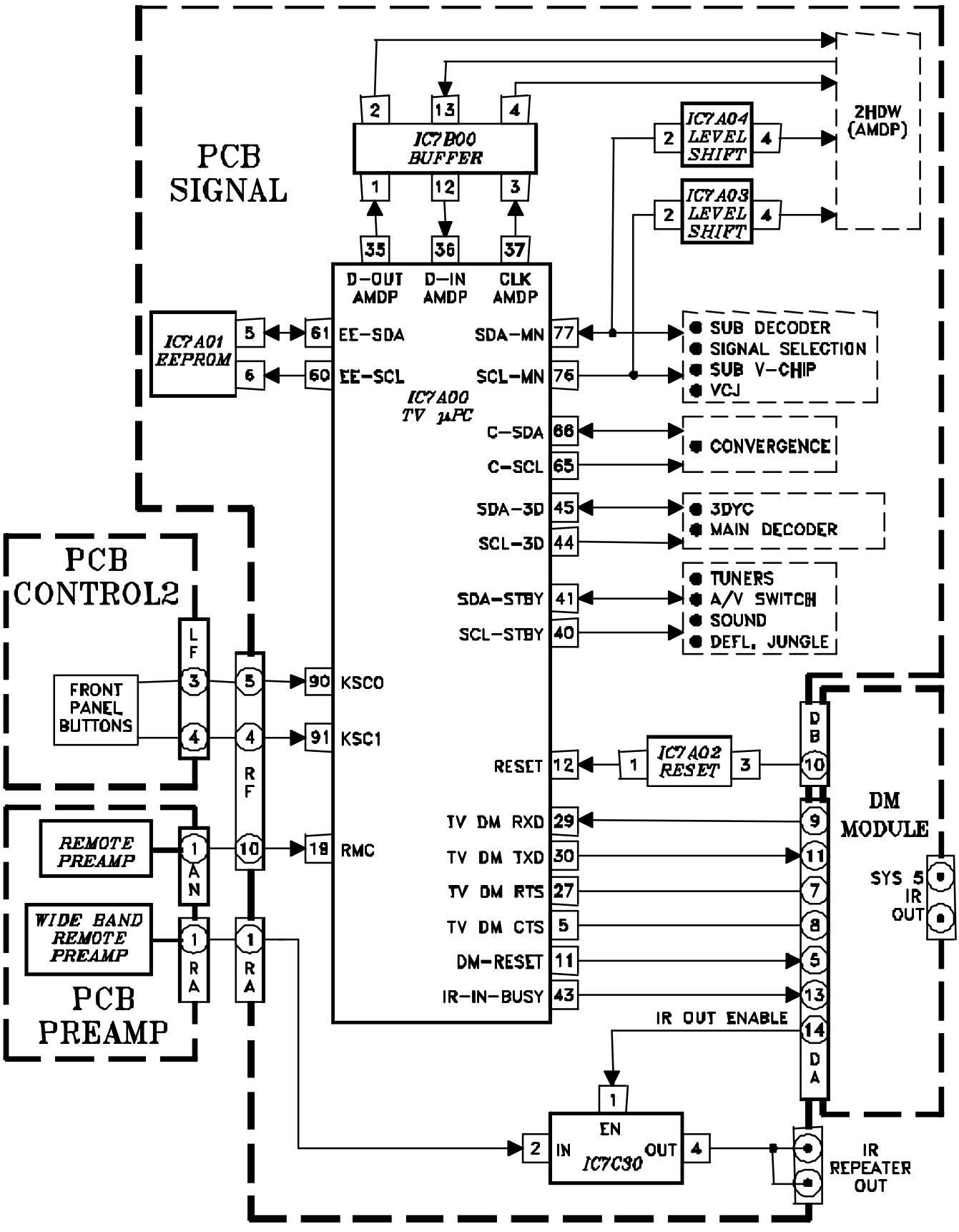
SOUND CIRCUIT



CONVERGENCE CIRCUIT



CONTROL CIRCUIT

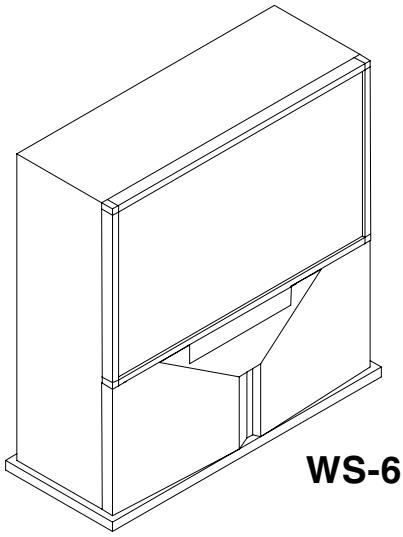


2001

MITSUBISHI ELECTRIC

Service Manual

PROJECTION TELEVISION
V19 / V19+ CHASSIS



WS-65869

V19 MODELS	V19+ MODELS
WS-55859	WS-55909
WS-65869	WS-65909
	WS-73909

CAUTION:
Before servicing this chassis, it is important that the service person read the "SAFETY PRECAUTIONS" and "PRODUCT SAFETY NOTICE" contained in this manual.

PART 2
SCHEMATIC DIAGRAMS

CONTENTS **Page**

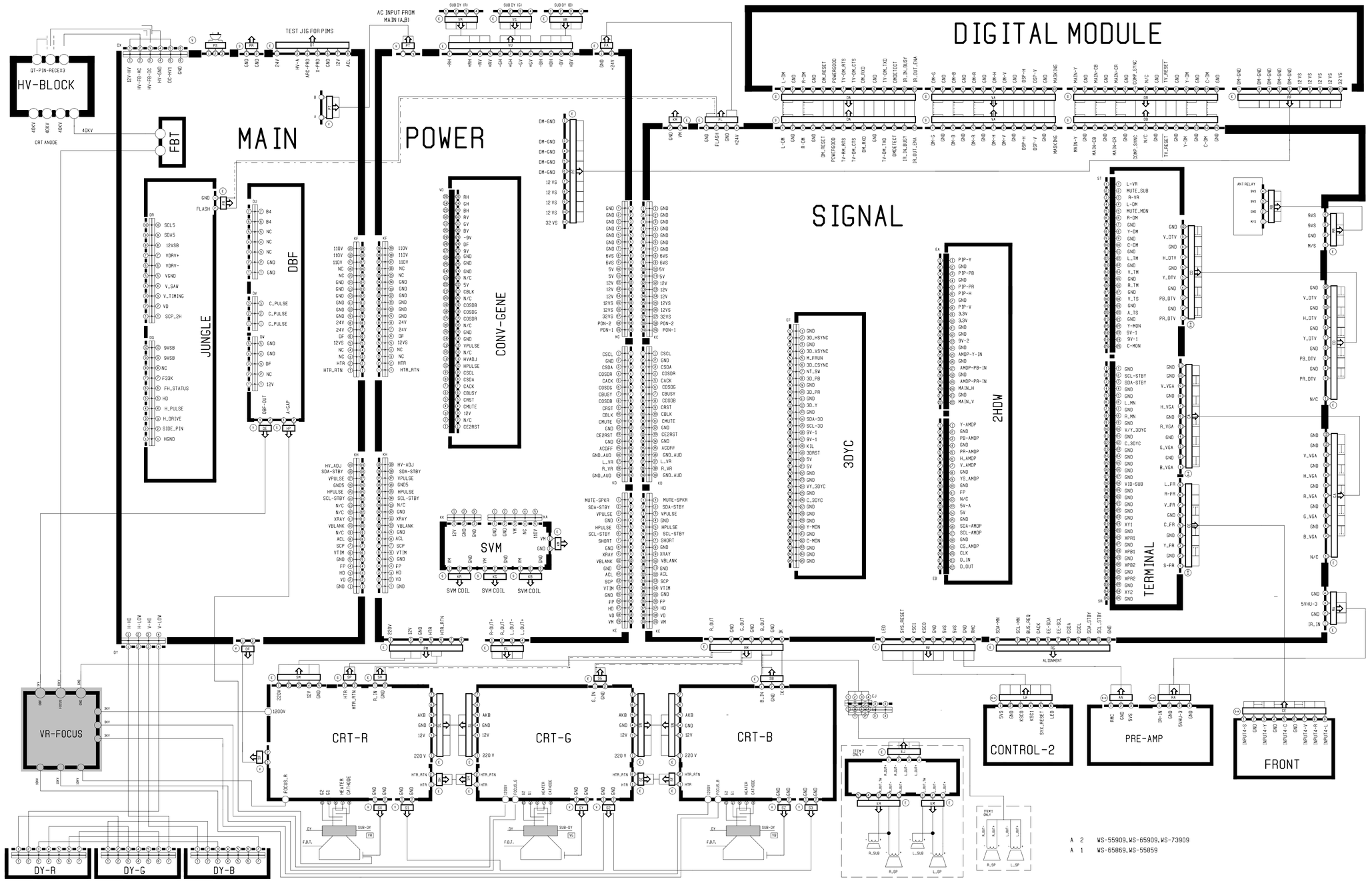
Overall PCB Block Diagram 1
PCB-MAIN 2
PCB-POWER 3
PCB-TERMINAL 4
PCB-SIGNAL-1 (MICRO) 5
PCB-SIGNAL-2 (AV I/O) 6
PCB-SIGNAL-3 (VIDEO/CHROMA) 7
PCB-3DYC 8
PCBs-CONV GEN / JUNGLE 9
PCBs-CRT / CONTROL /SVM / DBF / DM POWER 10
PCB-2HDW-1 11
PCB-2HDW-2 12
PCB-2HDW-3 13

Refer to PART 1 for:

- Specifications
- Safety Precautions
- Disassembly
- CRT Replacement
- Electrical Adjustments
- Parts List
- Block Diagrams

MITSUBISHI DIGITAL ELECTRONICS AMERICA, INC.
9351 Jeronimo Road, Irvine, CA 92618-1904

Copyright © 2001 Mitsubishi Digital Electronics America, Inc.
All Rights Reserved



× NOTES

1. DC voltages were measured from points indicated to the circuit ground with a high-Z voltmeter.
2. Waveforms were taken with standard color bar signal
3. TP15,etc. show Test Points
4. CAPACITORS

Value	Not indicated	[PF, for numbers more than 1 / µF, for numbers less than 1]			
Dielectric Strength	Not indicated ÷50V				
Tolerance	Not indicated = ±10× [No tolerance is indicated for electrolytic capacitors and ± 20×]				
	G = ±2×	P = +100×	Q = +30×	C = ±0.25PF	
	J = ±5×	-0×	-10×	D = ±0.5PF	
	K = ±10×	Z = +80×	T = +200×	F = ±1PF	
	M = ±20×	-20×	-0×	D = ±2PF	
Type I Parts except for chips	Not indicated	÷Ceramic capacitor			
	MF	÷Polyester capacitor			
	PP	÷Polypropylene film capacitor			
	ALM	÷Aluminus electrolytic capacitor			
	TF	÷Twin film capacitor			
	SC	÷Semiconductor Ceramic capacitor			
	MP	÷Metalized paper			
	MPP	÷Metalized plastic film capacitor			
	MMF	÷Metalized polyester capacitor			
	MF,PP	÷Polyester polypropylene film capacitor			
	PS	÷Styrol capacitor			
	TAN or (TANT)	÷Tantalum capacitor			
		÷Electrolytic capacitor			
	NP	÷Non polarized electrolytic capacitor			
Type II Chips	Not indicated	÷Ceramic capacitor chip			
		÷Electrolytic capacitor			
	NP	÷Non polarized electrolytic capacitor chip			
Characteristic (only ceramic capacitor)	Not indicated	÷F or B (high dielectric percentage)			
	CH,SL,etc.	÷Temperature compensating types			

5. RESISTORS

Value	Not indicated = Ohm / K = 1,000 Ohm / M = 1,000,000 Ohm				
Wattage	Parts except for chips	Not indicated = 1/4W or 1/6W			
	Chips	Not indicated = 1/10W			
Tolerance	Not indicated = ±5×				
	D = ±0.5×	J = ±5×			
	F = ±1×	K = ±10×			
Type I Parts except for chips	Not indicated	÷Carbon resistor			
	S	÷Fixed composition resistor			
	MD	÷Metal oxide film resistor (type B)			
	CE	÷Cemented resistor			
	W	÷Wire wound resistor			
	M	÷Metal film resistor			
	MPC	÷Metal plate cement resistor			
	ML	÷Metal liner resistor			
Type II Chip	Not indicated	÷Chip resistor			

6. This is a basic schematic diagram.Some sets may be subject to modification according to engineering improvement.

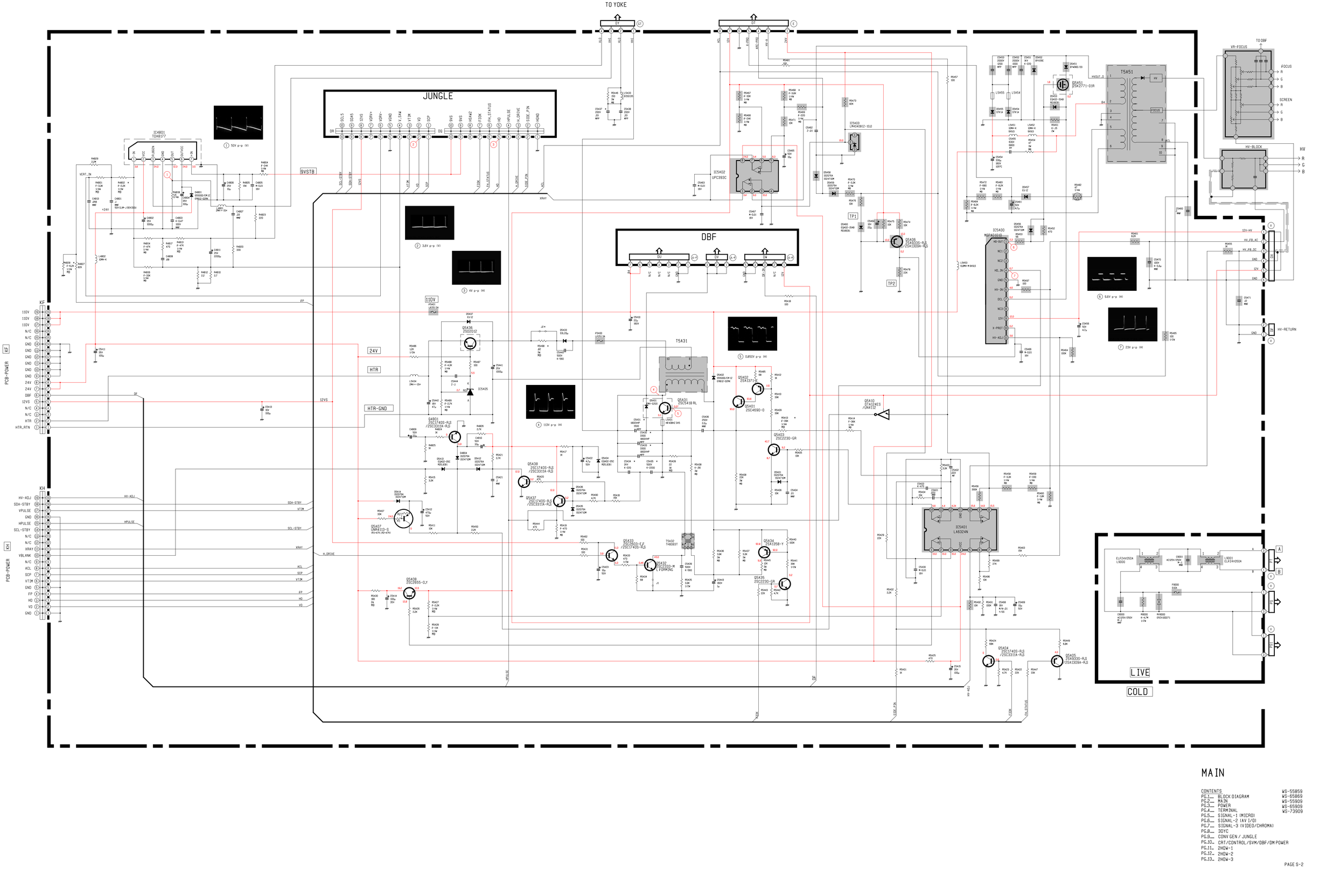
SHADED COMPONENTS HAVE SPECIAL CHARACTERISTICS IMPORTANT TO SAFETY. BEFORE REPLACING ANY OF THESE COMPONENTS READ CAREFULLY THE PRODUCT SAFETY NOTICE IN THE SERVICE MANUAL. DON'T DEGRADE THE SAFETY OF THE RECEIVERS THROUGH IMPROPER SERVICING.

SERVICE TECHNICIAN WARNING:
X-RADIATION PRECAUTION
THIS PRODUCT INCLUDES CRITICAL ELECTRICAL AND MECHANICAL PARTS ESSENTIAL FOR X-RADIATION PROTECTION.
TO AVOID POSSIBLE EXPOSURE TO X-RADIATION TAKE X-RADIATION PROTECTIVE MEASURES FOR PERSONNEL DURING SERVICING.
SEE SERVICE INSTRUCTIONS FOR SPECIFIED REPLACEMENT PARTS AND SERVICE ADJUSTMENTS.

A 2 WS-55909,WS-65909,WS-73909
A 1 WS-65869,WS-55859

CONTENTS

PG.1	BLOCK DIAGRAM	WS-55859
PG.2	MAIN	WS-65869
PG.3	POWER	WS-55909
PG.4	TERMINAL	WS-65909
PG.5	SIGNAL-1 (AV I/O)	WS-73909
PG.6	SIGNAL-2 (MICRO)	
PG.7	SIGNAL-3 (VC/SW)	
PG.8	3DYC	
PG.9	CONV GEN / JUNGLE	
PG.10	CRT/CONTROL/AI/SVM/DBF/DM POWER	
PG.11	2HDW-1	
PG.12	2HDW-2	
PG.13	2HDW-3	


TO YOKE
DY
DT
DBF
DU
DV
DW
JUNGLE
IC4B01
TDA8177
9VSTB
XRAY
24V
HTR
HTR-GND
12VS
110V
KF
KH
PCB-POWER
T5A51
HV
FOCUS
VR-FOCUS
SCREEN
HV-BLOCK
TO DBF
HV-RETURN
IC5A01
LA6324N
IC5A02
UPC393C
IC5A03
LM4040BIZ-10.0
IC5A04
MSPA0101G
T5A31
T5A32
THB083T
Q5A01
2SC4690-O
Q5A02
2SA1371E
Q5A03
2SC2230-GR
Q5A04
2SC1740S-R,S
/2SC3311A-R,S
Q5A05
2SA933S-R,S
/2SA1309A-R,S
Q5A06
2SA1535-R,S
/2SA1309A-R,S
Q5A07
UNR4113-S
Q5A08
2SC2655-O,Y
Q5A10
DTA124ES
/UMA1D
Q5A27
2SC1740S-R,S
/2SC3311A-R,S
Q5A31
2SC4181 RL
Q5A34
2SA1358-Y
Q5A35
2SC2230-GR
Q5A38
2SC1740S-R,S
/2SC3311A-R,S
Q5A39
2SC3303-M
(FORMING)
Q5A40
2SC3303-E,F
/2SC1740S-R,S
Q5B36
2SC2655-O,Y
LIVE
COLD
MAIN
CONTENTS
PG.1 BLOCK DIAGRAM WS-55869
PG.2 MAIN WS-55909
PG.3 POWER WS-65909
PG.4 TERMINAL WS-73909
PG.5 SIGNAL-1 (MICRO)
PG.6 SIGNAL-2 (AV I/O)
PG.7 SIGNAL-3 (VIDEO/CHROMA)
PG.8 3DYC
PG.9 CONV.GEN / JUNGLE
PG.10 CRT/CONTROL/SVM/DBF/DM POWER
PG.11 2HDW-1
PG.12 2HDW-2
PG.13 2HDW-3
PAGE S-2

LIVE

COLD

MAIN TRANSFORMER

STANDBY TRANSFORMER

CONVERGENCE OUT AMPLIFIER

CONV-GENERATOR

AUDIO AMPLIFIER

PCB-MAIN [PT]

PCB-SIGNAL-3 [KC]

PCB-DM POWER [PF]

PCB-SVM [KA]

PCB-SVM [KK]

PCB-CRT (R) [SM]

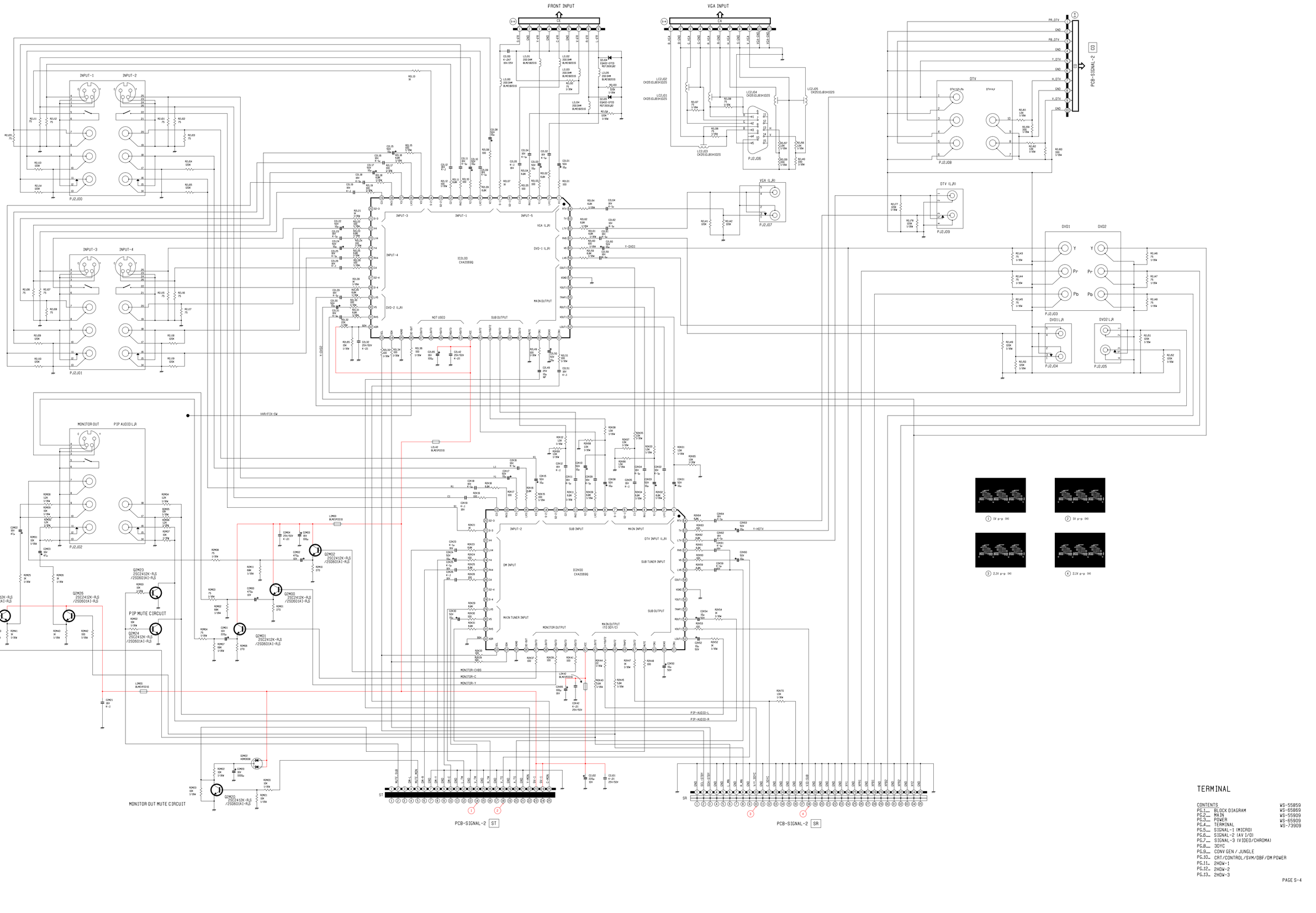
PCB-MAIN [KH]

(TO SIGNAL PWB)

(TO SPEAKERS)

POWER

CONTENTS		WS-55859
PG.1	BLOCK DIAGRAM	WS-55869
PG.2	MAIN	WS-55909
PG.3	POWER	WS-65909
PG.4	TERMINAL	WS-73909
PG.5	SIGNAL-1 (MICRO)	
PG.6	SIGNAL-2 (AV I/O)	
PG.7	SIGNAL-3 (VIDEO/CHROMA)	
PG.8	3DYC	
PG.9	CONV GEN / JUNGLE	
PG.10	CRT/CONTROL/SVM/DBF/DM POWER	
PG.11	2HDW-1	
PG.12	2HDW-2	
PG.13	2HDW-3	



1 1V p-p (H)

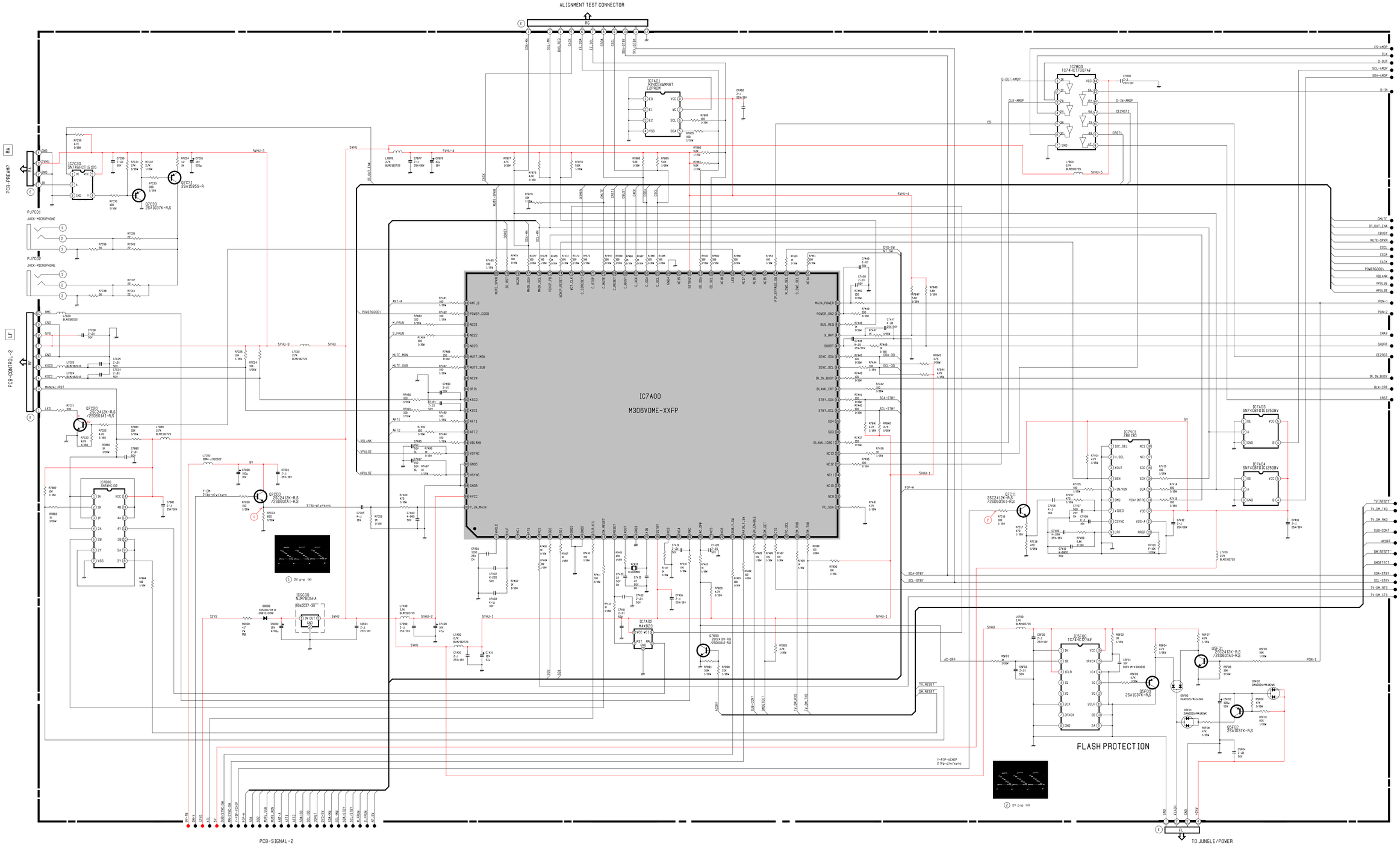
2 1V p-p (H)

3 2.1V p-p (H)

4 2.1V p-p (H)

TERMINAL

CONTENTS		
PG.1....	BLOCK DIAGRAM	WS-55859
PG.2....	MAIN	WS-65869
PG.3....	POWER	WS-55909
PG.4....	TERMINAL	WS-65909
PG.5....	SIGNAL-1 (MICRO)	WS-73909
PG.6....	SIGNAL-2 (AV I/O)	
PG.7....	SIGNAL-3 (VIDEO/CHROMA)	
PG.8....	3DYC	
PG.9....	CONV.GEN / JUNGLE	
PG.10..	CRT/CONTROL/SVM/DBF/DM POWER	
PG.11..	2HDW-1	
PG.12..	2HDW-2	
PG.13..	2HDW-3	



MICRO

CONTENTS		
PG.1	BLOCK DIAGRAM	WS-55859
PG.2	MAIN	WS-65869
PG.3	POWER	WS-55909
PG.4	TERMINAL	WS-65909
PG.5	SIGNAL-1 (MICRO)	WS-73909
PG.6	SIGNAL-2 (AV I/O)	
PG.7	SIGNAL-3 (VIDEO/CHROMA)	
PG.8	3DYC	
PG.9	CONV GEN / JUNGLE	
PG.10	CRT/CONTROL/SVM/DBF/DM POWER	
PG.11	2HDW-1	
PG.12	2HDW-2	
PG.13	2HDW-3	

PAGE S-5

* EXCEPT WHERE NOTED, ALL OPEN-ENDED CIRCUIT PATHS CONNECT TO THE SIGNAL-3 SCHEMATIC

PCB-SIGNAL-1

PCB-SIGNAL-3

PCB-SIGNAL-3

MAIN SYNC SWITCHING LOGIC

MN-SYNC-SW=H	SYNC FROM CXA2151Q
MN-SYNC-SW=L	SYNC FROM CXA2019AQ

MAIN SYNC DETECT (SD1)

SUB SYNC DETECT (SD2)

ANT-A	M/S	RF PATH
H	SV	ANTA←→MAIN ANTA←→AP2P
L	SM	ANTA←→MAIN ANTA←→AP2P

SUB SYNC SWITCHING LOGIC

SUB-SYNC-SW=H	SYNC FROM CXA2151Q
SUB-SYNC-SW=L	SYNC FROM CXA2019AQ

DVD SWITCHING LOGIC

DVD-SW=H	DVD INPUT-2 SELECTED
DVD-SW=L	DVD INPUT-1 SELECTED

PCB-TERMINAL CU

PCB-TERMINAL CD

PCB-TERMINAL ST

PCB-TERMINAL SR

PCB-TERMINAL EF

PCB-201C

PCB-SIGNAL-3

MAIN AMP SYNC SWITCH

SUB AMP SYNC SWITCH

VGA INPUT

IC2800 CXA2151Q SUB COMPONENT SWITCH

IC2A00 CXA2151Q MAIN COMPONENT SWITCH

IC2H00 CXA2019Q SUB DECODER

IC2A60 M52055FP

IC3A01 TDA9855

AUD.PROCESSOR ST/SAP DECODER

IC2F80 TC74HC4053AFT

IC2F70 TC74HC4053AFT

IC2F50 LM1881M

IC3C03 NJM78M05DL A

IC3C01 NJM78D9FA/A78D09F

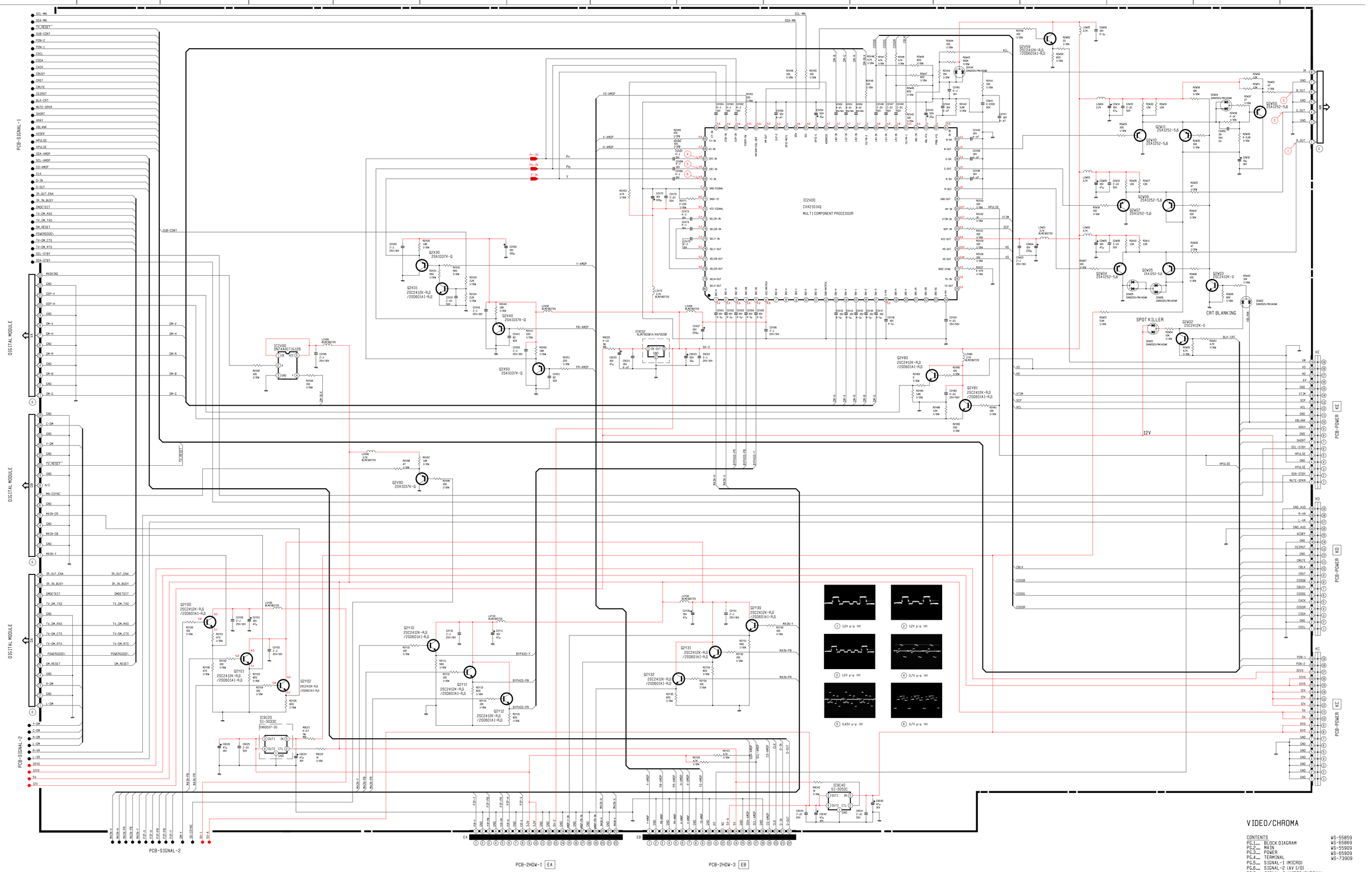
TUNER1

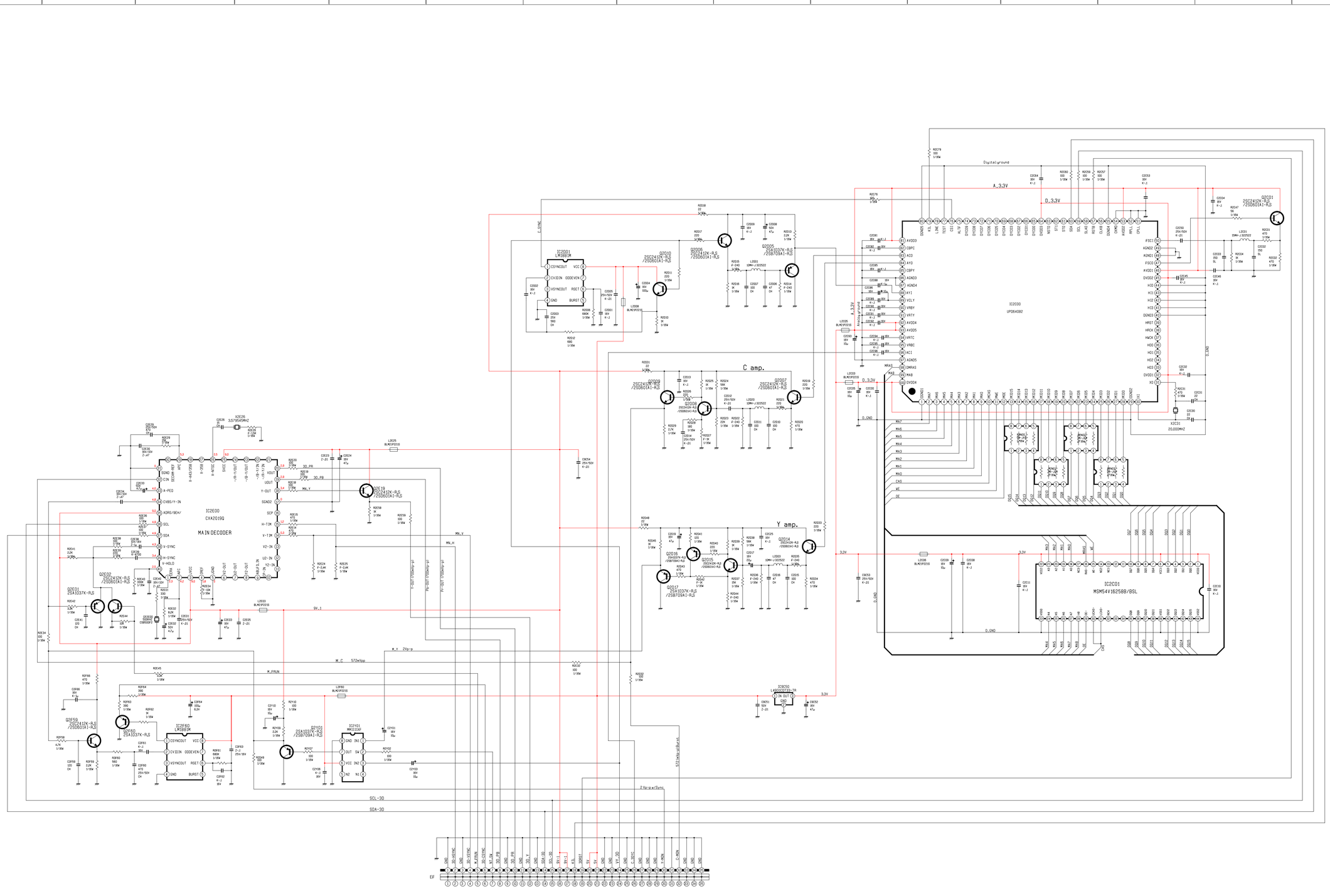
TUNER2

RF SWITCH

AV/IO

CONTENTS	WS-55859
PG.1.... BLOCK DIAGRAM	WS-65869
PG.2.... MAIN	WS-55909
PG.3.... POWER	WS-65909
PG.4.... TERMINAL	WS-73909
PG.5.... SIGNAL-1 (MICRO)	
PG.6.... SIGNAL-2 (AV I/O)	
PG.7.... SIGNAL-3 (VIDEO/CHROMA)	
PG.8.... 3DYC	
PG.9.... CONV GEN / JUNGLE	
PG.10... CRT/CONTROL/SVM/DBF/DM POWER	
PG.11... 2HDW-1	
PG.12... 2HDW-2	
PG.13... 2HDW-3	


PCB-SIGNAL-1
DIGITAL MODULE
SCL-MN
SDA-MN
TV_RESET
SUB-CONT
PON-S
PON-1
CSCL
CSDA
CACK
CBUSY
CRST
CMUTE
CBLK-CRT
MUTE-SPKR
SHORT
XRAY
VBLANK
ACOFF
HPULSE
VPULSE
SDA-AMDP
SCL-AMDP
CS-AMDP
CLK
D-IN
D-OUT
IR_OUT_ENA
IR_IN_BUSY
DMDETECT
TV_DM_TXD
TV_DM_RXD
TV-DM_CTS
TV-DM_RTS
POWERGOOD\
DM_RESET
R-DM
L-DM
MASKING
GND
DISP-V
DISP-H
DM-V
DM-H
DM-R
DM-B
DM-G
C-DM
Y-DM
MN-CSYNC
N/C
MAIN-CR
MAIN-CB
MAIN-Y
3DYC
CONV GEN / JUNGLE
CRT/CONTROL/SVM/DBF/DM POWER
2HDW-1
2HDW-2
2HDW-3
IC2V00
CXA2101AQ
MULTI COMPONENT PROCESSOR
IC9C20
S1-3033C
IC9C32
NJM78D5FA/AN78D5F
IC9C40
S1-3050C
Q2X30
2SA1037K-Q
Q2X31
2SC2412K-RS
/2SD601A1-RS
Q2X40
2SA1037K-Q
Q2X41
2SA1037K-Q
Q2X50
2SA1037K-Q
Q2Y00
2SC2412K-RS
/2SD601A1-RS
Q2Y01
2SC2412K-RS
/2SD601A1-RS
Q2Y02
2SC2412K-RS
/2SD601A1-RS
Q2Y10
2SC2412K-RS
/2SD601A1-RS
Q2Y11
2SC2412K-RS
/2SD601A1-RS
Q2Y12
2SC2412K-RS
/2SD601A1-RS
Q2Y30
2SC2412K-RS
/2SD601A1-RS
Q2Y31
2SC2412K-RS
/2SD601A1-RS
Q2Y32
2SC2412K-RS
/2SD601A1-RS
Q2Y90
2SA1037K-Q
Q2V59
2SC2412K-RS
/2SD601A1-RS
Q2V80
2SC2412K-RS
/2SD601A1-RS
Q2V81
2SC2412K-RS
/2SD601A1-RS
Q2W01
2SA1252-5,6
Q2W02
2SC2412K-S
Q2W03
2SC2412K-S
Q2W04
2SA1252-5,6
Q2W05
2SA1252-5,6
Q2W06
2SA1252-5,6
Q2W07
2SA1252-5,6
Q2W08
2SA1252-5,6
Q2W09
2SA1252-5,6
Q2W10
2SA1252-5,6
Q2W11
2SA1252-5,6
Q2W12
2SA1252-5,6
SPOT KILLER
CRT BLANKING
BLK-CRT
VBLANK
HPULSE
VPULSE
12V
PCB-SIGNAL-2
PCB-2HDW-1
EA
PCB-2HDW-3
EB
PCB-POWER
KE
KD
KC
1 12V p-p (H)
2 12V p-p (H)
3 12V p-p (H)
4 0.7V p-p (H)
5 0.45V p-p (H)
6 0.7V p-p (H)
VIDEO/CHROMA
CONTENTS
PG.1 BLOCK DIAGRAM WS-55859
PG.2 MAIN WS-55869
PG.3 POWER WS-55909
PG.4 TERMINAL WS-55909
PG.5 SIGNAL-1 (MICRO) WS-73909
PG.6 SIGNAL-2 (AV I/O)
PG.7 SIGNAL-3 (VIDEO/CHROMA)
PG.8 3DYC
PG.9 CONV GEN / JUNGLE
PG.10 CRT/CONTROL/SVM/DBF/DM POWER
PG.11 2HDW-1
PG.12 2HDW-2
PG.13 2HDW-3
PAGE S-7


IC2E00
CXA2019Q
MAIN DECODER
IC2C00
UPD64082
IC2C01
MSM54V16259B/BSL
IC2F60
LM1881M
IC2Y01
MM1110XF
IC2C50
LA6310T03-TR
X2E26
3.579545MHz
X2C31
20.000MHz
Y amp.
C amp.
Digitalground
D_GND
A_3.3V
D_3.3V
3.3V
5V_1
M_C 572mVpp
M_Y 2Vp-p
M_FBLN
SCL-3D
SDA-3D
PCB-SIGNAL-2
EF
3DY/C
CONTENTS
PG.1.... BLOCK DIAGRAM WS-55859
PG.2.... MAIN WS-65869
PG.3.... POWER WS-55909
PG.4.... TERMINAL WS-65909
PG.5.... SIGNAL-1 (MICRO) WS-73909
PG.6.... SIGNAL-2 (AV I/O)
PG.7.... SIGNAL-3 (VIDEO/CHROMA)
PG.8.... 3DYC
PG.9.... CONV GEN / JUNGLE
PG.10.. CRT/CONTROL/SVM/OBF/DM POWER
PG.11.. 2HDW-1
PG.12.. 2HDW-2
PG.13.. 2HDW-3
PAGE S-8

IC8E03
CD0031AM
IC800
CM0022AF
CONVERGENCE GENERATOR
IC801
ST24C32-MN6T
/AT24C32N-10SI
/AK6010A
IC4A01
CXA2102Q
JUNGLE
IC4A03
TC74HC221AF
IC4A02
NJM78M09DLA
Q4A01
2SC2412K-R,S
Q4A02
2SC2412K-R,S
/2SD601AI-R,S
IC8E02
LM78L05ACZ/NJM78L05A
IC8E01
L4931CDT33-TR
Q8D01
2SC2412K-R,S
/2SD601AI-R,S
Q8D02
2SC2412K-R,S
/2SD601AI-R,S
IC802
TL084CD
IC803
TL084CD
IC804
TL084CD
3.3V
5V
9V
-9V
C_RESET
C_ACK
C_BUSY
C_MUTE
C_SDA
C_SCL
HV_ADJ
BLKOUT
V_SYNC
H_SYNC
C_OSDR
C_OSDG
C_OSDB
C_BLK
GH
BH
RH
BV
RV
GV
SCP_2H
VD
V_TIMING
V_SAW
VGND
VDRV-
VDR+
12VSB
SDA5
SCL5
SIDE_PIN
H_DRIVE
H_PULSE
HD
FH_STATUS
F33K
DR
PCB-MAIN
DQ
FB
E2RESET
12V
C_MUTE
C_RESET
C_BUSY
C_ACK
C_SDA
C_SCL
H_SYNC
HV_ADJ
V_SYNC
GND
C_OSDR
C_OSDG
C_OSDB
C_BLK
5V
BLKOUT
9V
DF
-9V
BV
GV
RV
BH
GH
RH
VD
PCB-POWER

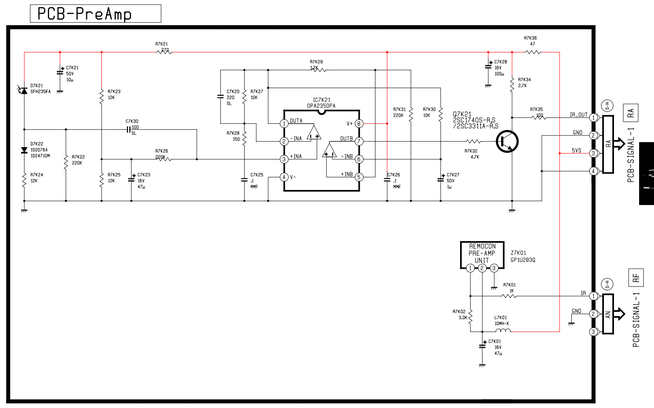
CONVERGENCE GEN. & JUNGLE

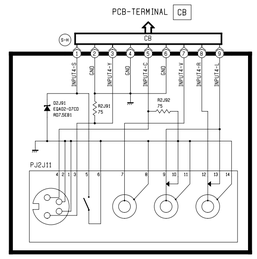
CONTENTS

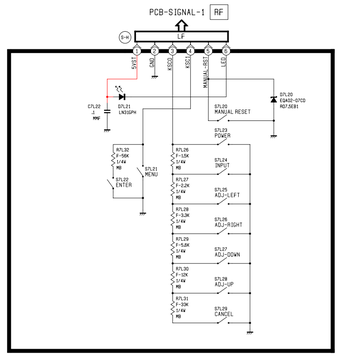
PG.1.... BLOCK DIAGRAM
PG.2.... MAIN
PG.3.... POWER
PG.4.... TERMINAL
PG.5.... SIGNAL-1 (MICRO)
PG.6.... SIGNAL-2 (AV I/O)
PG.7.... SIGNAL-3 (VIDEO/CHROMA)
PG.8.... 3DYC
PG.9.... CONV GEN / JUNGLE
PG.10.. CRT/CONTROL/AI/SVM/DBF/DM POWER
PG.11.. 2HDW-1
PG.12.. 2HDW-2
PG.13.. 2HDW-3

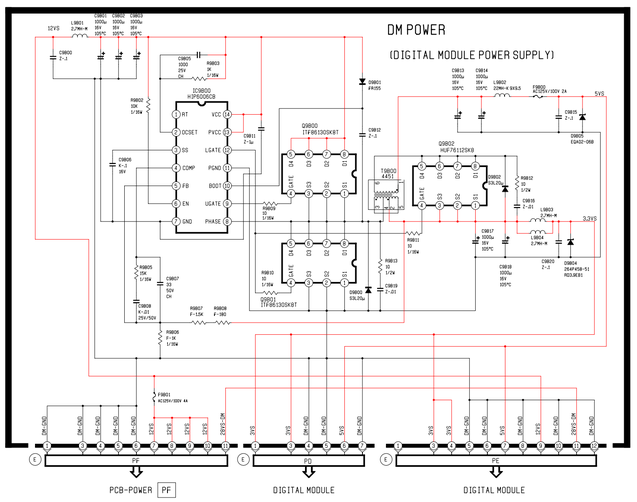
WS-55859
WS-65869
WS-55909
WS-65909
WS-73909

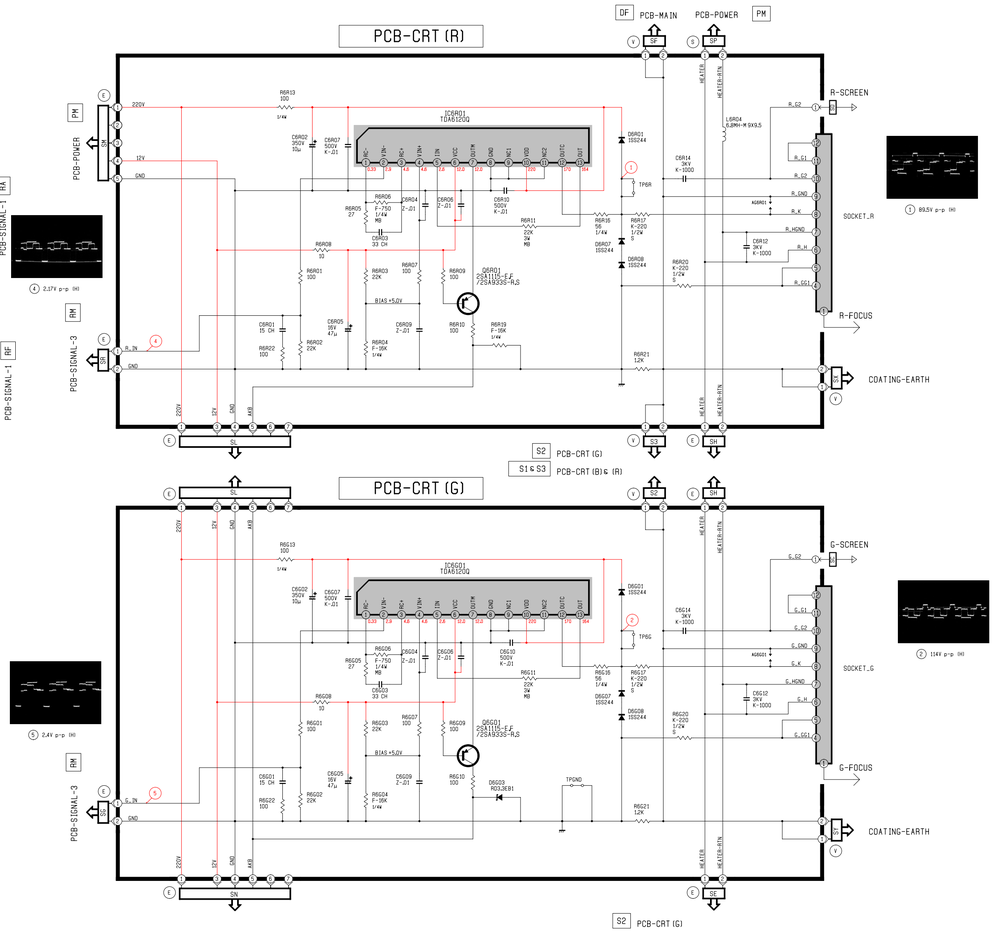
DATETIME=10-15-2001_8:13

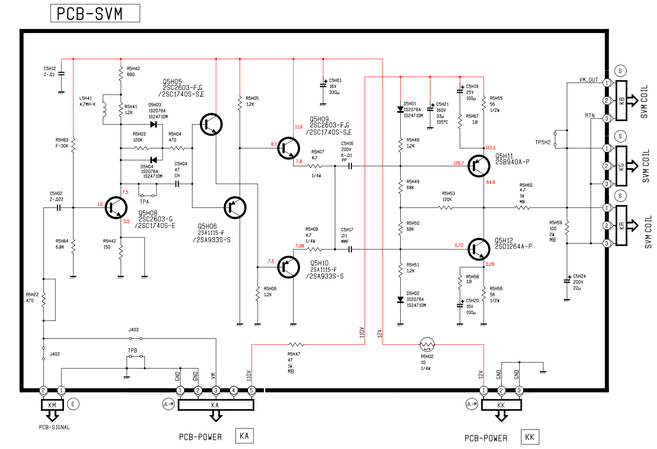


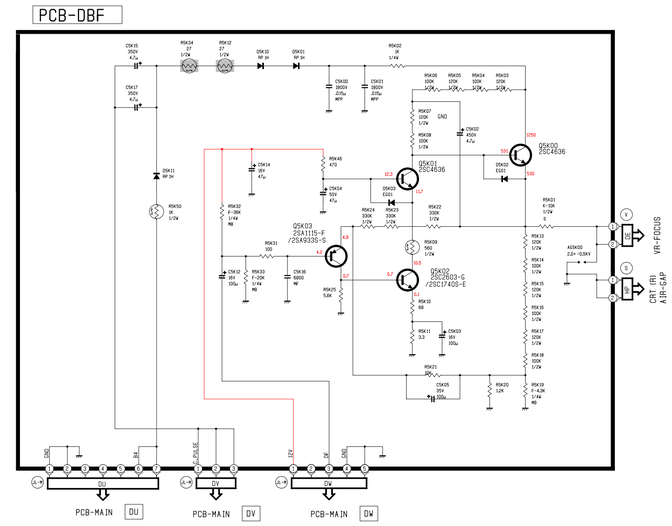


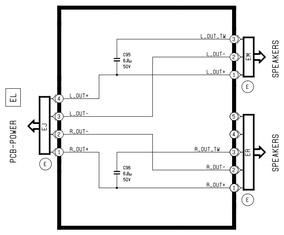






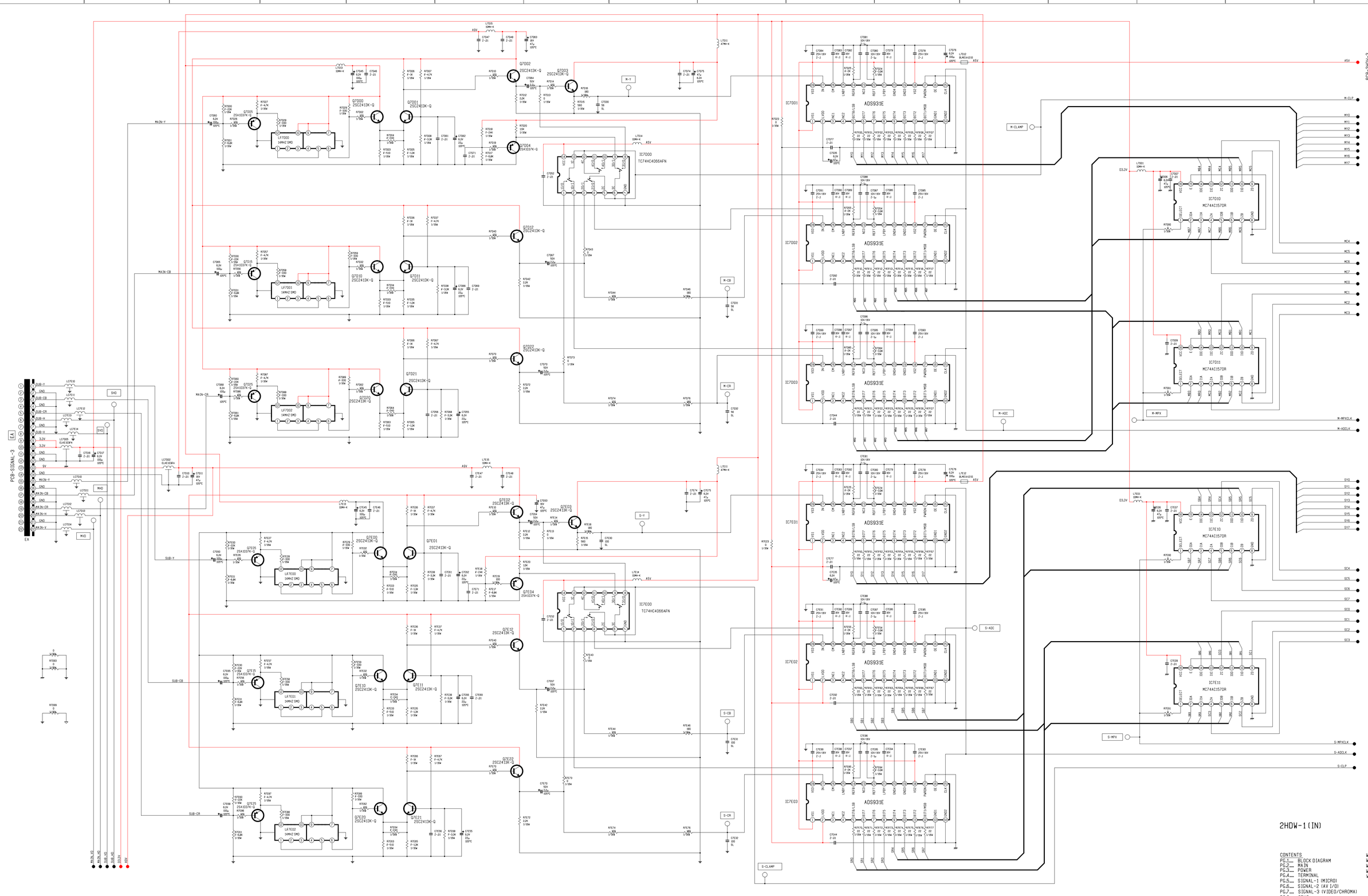






MBC-2 / DM-POWER

CONTENTS		
PG.1	BLOCK DIAGRAM	WS-55869 WS-65869
PG.2	MAIN	WS-55909
PG.3	POWER	WS-65909
PG.4	TERMINAL	WS-73909
PG.5	SIGNAL-1 (MICRO)	
PG.6	SIGNAL-2 (AV I/O)	
PG.7	SIGNAL-3 (VIDEO/CHROMA)	
PG.8	3DYC	
PG.9	CONV GEN / JUNGLE	
PG.10	CRT/CONTROL/SVM/DBF/DM POWER	
PG.11	2HDW-1	
PG.12	2HDW-2	
PG.13	2HDW-3	



×EXCEPT WHERE NOTED, ALL OPEN-ENDED CIRCUIT PATHS CONNECT TO THE 2HDW-2 SCHEMATIC

CONTENTS

PG.1	BLOCK DIAGRAM	WS-55859
PG.2	MAIN	WS-55869
PG.3	POWER	WS-55909
PG.4	TERMINAL	WS-65909
PG.5	SIGNAL-1 (MICRO)	WS-73909
PG.6	SIGNAL-2 (AV I/O)	
PG.7	SIGNAL-3 (VIDEO/CHROMA)	
PG.8	3DYC	
PG.9	CONV GEN / JUNGLE	
PG.10	CRT/CONTROL/SVM/DBF/DM POWER	
PG.11	2HDW-1	
PG.12	2HDW-2	
PG.13	2HDW-3	

IC7H02
TMX57127

IC7H07
SLA4028F3N

IC7H00
UPD45161614G5-A10-9NF

IC7H01
UPD45161614G5-A10-9NF

IC7H03
M5M534031E-xxTS-K

IC7H04
M51957BFP

IC7H05
TC74HC221AF

IC7H06
TLC2932IPW

IC7H08
TLC2932IPW

IC7H09
TC74HC17007AF

IC7H11
MC74AC157DR

IC7H12
MC74AC157DR

IC7H13
MC74AC157DR

IC7H14
MC74AC157DR

Q7H1D
2SC2412K-Q

Q7H2D
2SC2412K-Q

X7H01
32027519Y
32.000MHz

PCB-2HDW-3

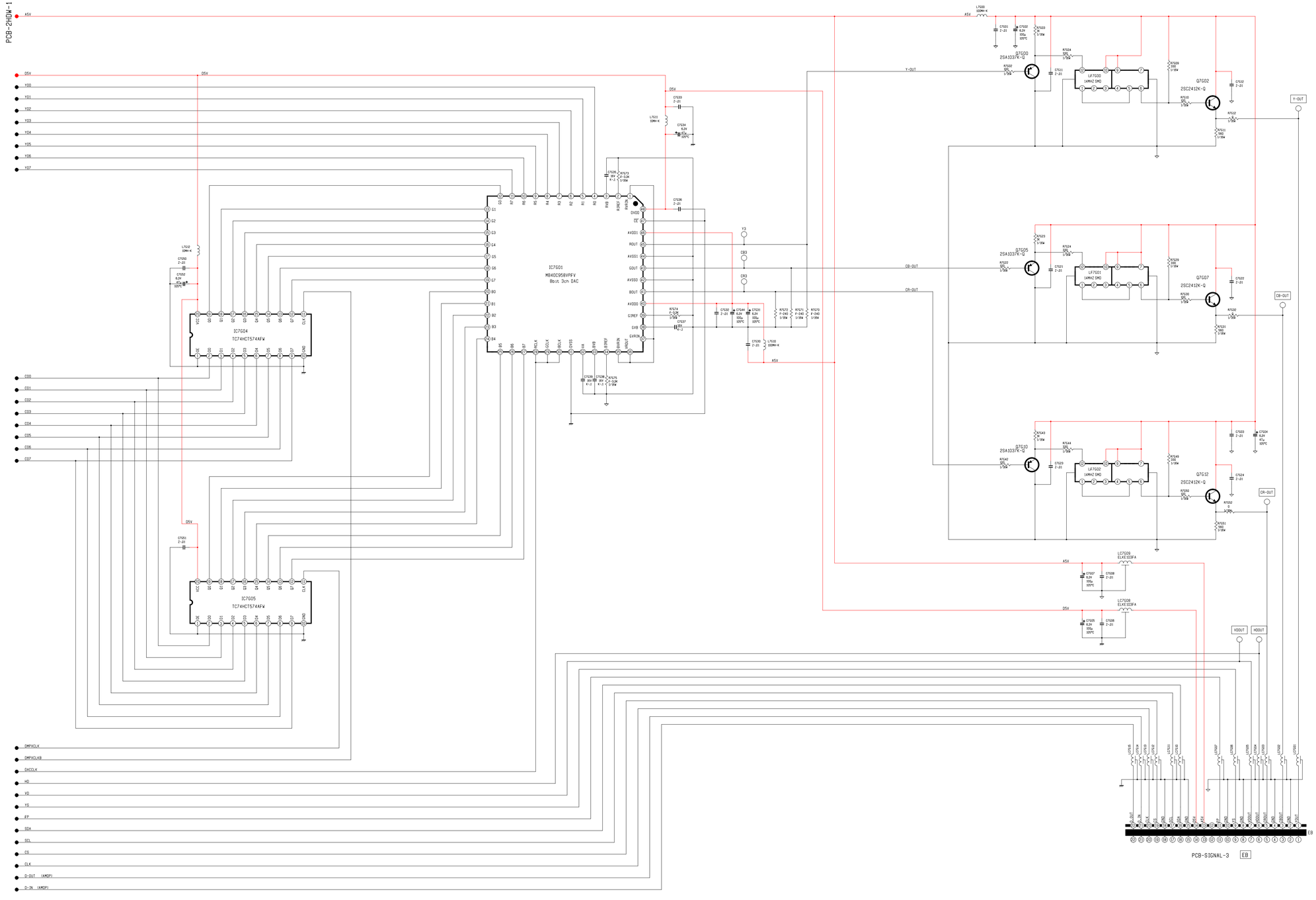
PCB-2HDW-3

2HDW-2 (MAIN)

CONTENTS

PG.1	BLOCK DIAGRAM	WS-55859
PG.2	MAIN	WS-55869
PG.3	POWER	WS-55909
PG.4	TERMINAL	WS-73909
PG.5	SIGNAL-1 (MICRO)	
PG.6	SIGNAL-2 (AV I/O)	
PG.7	SIGNAL-3 (VIDEO/CHROMA)	
PG.8	3DYC	
PG.9	CONV GEN / JUNGLE	
PG.10	CRT/CONTROL/SVM/DBF/DM POWER	
PG.11	2HDW-1	
PG.12	2HDW-2	
PG.13	2HDW-3	

× EXCEPT WHERE NOTED, ALL OPEN-ENDED CIRCUIT PATHS CONNECT TO THE 2HDW-1 SCHEMATIC



2HDW-3 (OUT)

CONTENTS		
PG.1	BLOCK DIAGRAM	WS-55859
PG.2	MAIN	WS-55909
PG.3	POWER	WS-55909
PG.4	TERMINAL	WS-73909
PG.5	SIGNAL-1 (MICRO)	
PG.6	SIGNAL-2 (AV I/O)	
PG.7	SIGNAL-3 (VIDEO/CHROMA)	
PG.8	3DYC	
PG.9	CONV GEN / JUNGLE	
PG.10	CRT/CONTROL/SVM/OBF/DM POWER	
PG.11	2HDW-1	
PG.12	2HDW-2	
PG.13	2HDW-3	

※EXCEPT WHERE NOTED, ALL OPEN-ENDED CIRCUIT PATHS CONNECT TO THE 2HDW-2 SCHEMATIC